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*Illustrated.

A Rather Large Order

No one will question that the Interstate Commerce Commission has a legal and moral right to ask for the most detailed information regarding the use railways make of their revenues, the means they employ to make their operations economical, and the relations which exist between their managers and managements and the supply concerns from which they buy materials and equipment and the financial concerns through which they market their securities. Most people will agree that the possession of such information must tend to aid the commission in regulating rates. But the fairness and public expediency of demanding that such a vast volume of detailed information as is required by the questionnaire just submitted by the commission to the eastern railways shall be supplied by the carriers in the hearing of a single case are very questionable. The commission has been regulating railways under the Interstate Commerce Act for almost twenty-seven years. It has been regulating them under the Hepburn Act for seven and one-half years. It has been regulating them under the Mann-Elkins Act for three and one-half years. It is now almost three years since the decisions in the original rate advance cases were rendered. The commission has gone right along regulating rates all this time. Why, then, hasn't it found out before that some or all of these detailed facts were needed as a basis for regulating rates? With all due respect to the commission, if the carriers in eastern territory should immediately furnish all the data they are asked for, the commission could not wade through it, digest it and draw rational conclusions from it in five years, if meantime it performed its other duties. If the commission intends to base its decision, to any considerable extent, on the results of this questionnaire, then its decision will be long postponed and the present depression in business, will, so far as it is due to the condition of the railways, be long continued.

The Waiting Steel Market

The present conditions in the steel rail market are in decided contrast to those existing at this time last year. On January 1, 1913, a large proportion of the orders for rails to be rolled in 1913 had been placed, and the mills began rolling their 1913 orders immediately upon completion of those for 1912. Only a few large orders have been placed for this year, and it is understood that late delivery is generally specified in these. Most of the large roads have ordered no rail for delivery this year, and with one or two exceptions, those which have done so have not ordered enough for their normal requirements. The requirements for the coming year have been decided upon by some of the roads for some time, and it is reasonable to expect large orders to be placed within the near future. Undoubtedly much of the present hesitancy is due to the uncertainty regarding the action of the Interstate Commerce Commission on the application of the eastern roads for an increase in rates and its influence on business in general. Also, with the slump in business suffered by the roads late last fall, some lines reduced their rail relaying operations and as a result have some new rail in stock which will be applied on this season's requirements. Comparatively little change in specifications is observed in the orders placed so far this year, the individual specifications of the different roads and those of the American Railway Engineering association being in use on practically the same lines as last year.

A Commissioner Looking for Aid

Reading between the lines in the abstract, published elsewhere in this issue, of the address of Commissioner Meyer before the American Economic Association, there is throughout suggested much of the difficulties of a member of the Interstate Commerce Commission who takes his vast task conscientiously and feels the responsibility placed on the commission in matters regarding which there is no available data on which to base opinions. Speaking of value of service as the guiding principle *for a regulative commission* in rate making, Commissioner Meyer says:

All that is necessary under the operations of that kind of a public-policy-system of rate making is a balance sheet and an eye on the next election. It is ascertained how much money the railway company can spare according

to its balance sheet, and then it is a matter of policy who shall get the benefit of the reduction or bear the burden of an advance.

In this sentence Commissioner Meyer sums up and expresses concretely that which is so plainly the underlying meaning of his whole discussion of "considerations in rate making." This principle of public-policy rate making, which, however, well or badly it may have worked when used by the traffic men themselves under the label of value of service, cannot, Commissioner Meyer believes, be the principle which shall guide the Interstate Commerce Commission, when it becomes necessary for it to take the initiative either by refusing advances in rates or ordering reductions in rates. He therefore falls back on cost accounting as a scientific aid in the fixing of rates. His plea is not for the adoption of any particular theories of cost accounting, but only for the co-operation of railroad men in evolving some scientific principles.

Tickets Instead of Cash Fares

On the St. Louis & San Francisco all passengers are called on to show their tickets before entering trains, not only at the large places, where gatemen are employed, but at all stations, except those where tickets are not sold. This businesslike and sensible plan—a plan which is not only businesslike but absolutely necessary, if the simplest requirements of common prudence are to be conformed to—has been in force throughout the 5,200 miles of the company's lines for the last three months, and the estimated increase in ticket sales is 10 per cent. On one division of the road this requirement has been in force for four years past, so it cannot be said that the officers have adopted the innovation without due consideration and reflection; and they say that the results are entirely satisfactory. This will be interesting news to operating officers all over the country, for the cares and troubles incident to the cash-fare question are felt everywhere. The Chicago & Alton tried this scheme a number of years ago, but after a short time gave it up—for reasons that were not very satisfactorily explained and which to some persons seemed not good ones. It looks as though permanent improvement might be expected in the present case. The Frisco's passenger traffic is quite heavy in some districts, but we are informed that no serious delays to trains or other difficulties have been encountered. A few passengers, but not many, have to be sent back to the office to buy tickets. Now and then someone makes so much fuss that he is admitted to the train without a ticket, but usually this class of people soon come to see the situation in its true light and are sufficiently ashamed of themselves to remember the conditions and to begin their next journey by buying a ticket.

Difficulties in Fare Collecting

Increasing the ticket sales by 10 per cent. does not, of course, mean complete stoppage of all leaks, but, with all local tickets made to expire in 24 to 48 hours from the time they are sold, the show-your-ticket scheme ought to go a good ways toward insuring the collection of full pay for all passenger service. Compelling passengers to buy tickets will not prevent a dishonest conductor from stealing, if he is persistent, for there are dishonest passengers ready to collude with him; but every improvement in the regulations which requires increased accuracy and attention to detail tends to inculcate honest habits all around. Details must always be carefully watched. The Frisco's passenger cars nearly all have vestibules, so that to make passengers enter a train at the door where the conductor wants them to enter is comparatively easy, but, with a long train, constant care is necessary, nevertheless. And, with conductors, collectors, brakemen and porters admitting passengers to a train, the trainmaster has quite a little job securing uniformity of conduct. The Frisco allows all of its men considerable discretion in dealing with objecting passengers, and this is one element of its success. Success in reducing the need for cash collections on trains to the lowest limit is well worth any amount of disregard of precedent that may be necessary to secure its accomplishment, for the present general practice in the matter of admitting passengers to cars at way stations is about the most flagrant violation of modern "efficiency" doctrines that can be found in the railway world. Mr. Brandeis ought to have "jumped on" it long since. Can it be that he, being a friend of the people, has refrained because of the popularity of the practice with the traveling public?

THE HOURS-OF-SERVICE REPORT

THE Interstate Commerce Commission's report on the operation of the hours-of-service law shows that in the fiscal year 1913 there were on the railroads of the United States over 300,000 cases where men were on duty for lengths of time exceeding those stipulated in the law. A large majority were cases of trainmen who were kept on duty more than 16 hours. A part of the commission's bulletin is reproduced elsewhere in this issue. The government has prosecuted in the courts 306 suits, involving 3,499 alleged violations of the law, and apparently has won on 1,936 of the 3,499 items.

These judicial tests are, no doubt, a valuable means of making the force of the law felt, and of impressing on careless officers the importance of keeping a strict watch on the rest-periods of trainmen, but the important lessons to be learned from this great mass of figures are yet to be discovered. Three hundred thousand cases in a year may be roughly estimated to mean a thousand cases a day; or, as a delayed train usually delays five or more men, we may say 200 crews a day, on 250,000 miles of railroad, or one train delayed each day on 1,250 miles of road. Or, calculating on the latest statistics available (those for 1911) and estimating 3½ million train miles in the country each day, we may say that the number of trips of 125 miles made daily was 28,000 (3,500,000 ÷ 125) and that therefore the number extending beyond 16 hours was (28,000 ÷ 200) 1 in 140. Even the layman knows that freight train work, with its cumbersome machinery and its locomotives always tasked to the limit of their capacity, is subject constantly to minor accidents and delays, and even the layman will therefore see that this record is not necessarily a record of evil, or even of neglect or inefficiency. In short, the impressive total of the report, when put in its true light, becomes a statement of what might be called a very commonplace fact.

Railway officers are entirely familiar with the causes which have made necessary the excessive hours worked by their men. As a rule they are taking measures to cure the curable defects in their schemes of management. In exceptional cases, like that cited by the commission, where on a certain road the number of men worked overtime was greatly reduced when the badness of the record was shown up, the officers deserve the criticism that publicity naturally brings upon them. But whether railway officers are or are not applying adequate remedies for the evils of overwork, there is nothing in the present report which will help much in finding or improving those remedies, and therefore we must wait for further information which shall show what is to be learned from the figures given.

The really significant thing about this elaborate report is its utter silence as to what, if any, specific ill effects resulted from these 300,000 cases of overwork. It gives the reader no hint of any actual effect of the hours-of-service law, so far as safety is concerned. Indeed, it is only in the crudest fashion that this hours-of-service statute fits the evil which

it was designed to remedy. While the record is not necessarily one of neglect or inefficiency, this is not saying that the 20-hour day, or even the 16-hour day, is justifiable. Every superintendent is bound by an intelligent consideration of the company's interest and of his own reputation to see that his men do not get tired and worn out while on the road. The trainmen themselves have an equally strong and rational motive. The brotherhood leaders and the railway officers are usually both blameworthy where reasonable regulations do not prevail. Perhaps superintendents who do not sufficiently appreciate the importance of having trainmen always in good mental and bodily condition have done less harm than have employees who fail of that appreciation or who let their desire to see a larger figure on the payroll overrule their own judgment. But the all-pervasive fact, to be kept in mind in considering every one of these 300,000 items, is that the harm done to the individual employee, the damage done to his health, or impairment of his efficiency as a safe trainman, may have been *nil.* This is a legitimate point of inquiry, for the statute was enacted by Congress on the plea that men had been forced to work until they were too tired to be safely entrusted with their duties.

Cases are constantly arising where men on duty not over 12 hours are inefficient, and sometimes even dangerous, because they are not well rested; while, on the other hand, thousands of men have remained on duty 18 or 20 hours, and longer, and have safely performed their functions. There may have been 300,000 cases of this last mentioned kind in the year to which this report refers. Take an ordinary freight train run of 12 hours. Suppose the train is stopped in the eleventh hour by some accident, by the failure of the locomotive, or by a landslide, or because of failure of connections. The men in the locomotive and those in the caboose must wait for relief. While waiting they are likely to rest, and (at least those in the caboose) even go to sleep. They will rest so much that they will tire of resting. Even if it takes them four hours to prepare for their unexpected wait, they will still cease activity within the period named in the law. Even if the delay be in the sixth or the third hour of the run the men are quite likely to get an amount of rest sufficient to keep them from becoming neglectful of their duties. The four men on the train (other than the engineer) are able in emergencies to relieve each other to a considerable extent and the engineer himself can secure snatches of relief when waiting on a side track and even, in some cases, while on the main track.

In this outline sketch favorable circumstances have been assumed. It is not claimed that circumstances are always favorable, nor that keeping awake on an engine after 16 hours is always easy; but the point is that to ameliorate the conditions of train delays is usually practicable and often easy; that trainmen can take advantage of this and that they do do so. It is their duty to thus favor themselves, as far as practicable, law or no law.

A large majority of cases where men are out 16 hours seem to be due to the feeling that 16 or even 18 hours on duty is not dangerous if men will do their best to keep alert (when alertness is their duty) and that the men will do this. This feeling is indulged in too much by superintendents, for the duty of keeping alert is not always appreciated by the men who man the trains. To keep within the law it is important that everybody strive at all times to keep three or four hours inside of the limit, for delays, though relatively few in number, are always liable to extend themselves in all sort of unexpected ways. The very excessive cases cited in the report are proper subjects for inquiry. It is to be presumed that in all these the men, though on duty, were not required to maintain the vigilance which is reasonably to be expected of a fresh man, unless they had had opportunity to refresh themselves. But it is desirable to have evidence of this, rather than a mere presumption.

A sixteen-hour limit *per se* is a good thing, but the problem of the railroads is to so improve the service that more energetic and persistent measures shall be taken to keep within a 14-hour or a 13-hour limit. In England the government frowns severely on every report showing cases of more than twelve hours' continuous duty in train service. The railroads in their reports to the commission present explanations and excuses. How many of these were acceptable to the commission? Ten per cent., 50 per cent., or 90 per cent.? Information on this point would be very interesting, but is omitted.

REGULATION OF RAILWAY SECURITIES

MEASURES for the regulation of the issuance of railway securities will be pressed in Congress this winter. The object sought is to prevent the real or fancied evils, resulting from over-capitalization. The principal of these real or fancied evils are: First, the charging of excessive rates; second, the deterioration of railway service; third, the causing of losses to investor.

Most people think that the strongest argument for regulation to prevent over-capitalization is that it tends to make rates unduly high. This is really the weakest argument. Under such competitive conditions as exist in the United States a railway with a large capitalization must accept the same rates as railways in the same territory having low capitalizations, and it is doubtful if over-capitalization ever caused a single rate to be advanced or to be kept higher than it otherwise would have been. Railways which are over-capitalized do not raise or keep up their rates in order to pay a return on their "water." On the contrary, the usual result of their over-capitalization is that they do not pay, and are not able to pay, a return on all their outstanding securities. They do sometimes pay interest and dividends on water for awhile; but this almost always means that they are diverting earnings which should be spent on maintenance.

The effect of paying out as interest and dividends earnings which should be spent for maintenance is to cause deterioration of the physical property and impair the service rendered to the public. In other words, the argument against over-capitalization, that it tends to interfere with the proper maintenance of railways, with the making of needed improvements and the rendering of good services is sound.

When pieces of paper indicating on their face that there was $100 paid into the company, are put on the market by large corporations, especially if those corporations have been paying substantial returns in the past, there is a natural tendency for many investors to accept them at, or approximately at, their face value. If they are not worth what they purport to be the purchasers suffer loss. The theory of law, that the purchasers can inform themselves as to the value of the securities that they buy, and that therefore they buy at their own risk, is no longer tenable or tolerable. Persons throughout the United States invest in railway securities. It is desirable that investment in them shall become more general. But it is obvious that persons throughout the United States do not have adequate opportunity to inform themselves regarding the physical and financial conditions of large railway properties. Therefore, it is a proper function of government to adopt, if practicable, some means for protecting investors against fraud and loss.

Many people think that the issuance of securities for less than par, and unless there has been, or is to be, an investment of $100 in the property for every $100 of par value of the securities, should be prohibited. This is not practical. The credit which a railway corporation has determines how much people will pay for its securities. All the legislation which could be passed from now until kingdom come could not compel or enable a railway which had not been paying a substantial dividend, and could not be reasonably expected to continue to pay it, to sell its stock

for $100 a share. The only effect on such roads of legislation requiring the issuance of stock at par would be to prevent them from issuing any stock at all. Stock certificates really represent nothing more than a share in the ownership of the property, while bonds and notes, on the other hand, are an acknowledgment of a debt which the company promises to pay. It has become customary, however, to designate on the face of stock certificates a "value" which is commonly spoken of as the par value and is supposed to represent the money value received by the company in exchange for the certificate of participation of ownership. These stock certificates are usually for $100 and par value, but the company can sell them, just as it can sell its bonds, only for what investors are willing to pay for them. To a certain extent the price at which bonds are sold by the company regulates itself, in that the bond promises to pay a definite amount to the holder at the end of a certain period. This amount must be paid or the holder of the bond can take legal steps to collect his debt through the sale of the property. The price at which a company can sell its bonds, therefore, stated in terms of per cent. of the amount of money which it promises to pay with interest at the end of a certain period, is regulated first by the investor's estimate of the company's ability to fulfill its promise, and secondly by the relation which the rate of interest which the company is going to pay during this period bears to the rate of interest being paid for money loaned on other than railway securities. The Interstate Commerce Commission's system of accounts provides that any discount on bonds or notes sold must be taken up through income or profit and loss during the life of the bonds. There is no promise, however, on the part of the railway to pay anything back to the stockholder, but, on the other hand, the par value of stock as carried on the company's books is supposed to represent a margin of safety to the bondholder. If, therefore, the company receives but $50 for a stock certificate having a par value of $100, and the outstanding stock is carried on the liability side of the balance sheet at its par value, there should be somewhere on the balance sheet a statement showing the difference between the nominal investment of the owners and the actual investment. The Interstate Commerce Commission provides for this in its latest rules for drawing up a general balance sheet by requiring an account, unextinguished discount on capital stock, which shall show for each sub-class of stock the discount from the par value at which this stock was sold by the company.

While legislation cannot compel or enable railways to sell securities for more than they are worth, it can do something to prevent securities from being issued for improper purposes; to prevent "insiders" from making immoral profits from their sale; and to make more sure that the money realized from their sale will be used only for those purposes for which it should be used. Probably legislation having these objects might properly provide—

First. The purposes for which securities might be issued.

Secondly. That the directors, or a majority of them, when securities were to be issued, should subscribe on the corporate minutes to a full statement of the purposes for which the money was to be used, and should send a copy of the statement to the Interstate Commerce Commission.

Thirdly. That the directors should subscribe annually to a sworn statement to the Interstate Commerce Commission showing how securities were sold, the proceeds derived from them, and the use to which the proceeds were put; and should furnish this information to the stockholders.

Fourthly. That it should be a criminal offense for directors to issue securities for any purpose not authorized by law, or without the consent of the Interstate Commerce Commission, to devote money realized from their sale to any purpose but that for which it was originally declared that the money was to be raised.

The foregoing is substantially the plan advocated a few years ago by Franklin K. Lane, then a member of the Interstate Commerce Commission, and now Secretary of the Interior. It is more radical than the plan recommended by the Hadley Railroad Securities Commission. It is more conservative than the plan advocated by many, of giving the Interstate Commerce Commission broad discretionary authority to control the issuance of securities. It is believed, however, that its passage and enforcement would abolish most of the abuses that have developed in connection with the financing of railways without producing the bad effects that probably would result from transferring to the Interstate Commerce Commission too much of the responsibility which should be borne, and the discretion which should be possessed and exercised, by the directors of railways.

It might be that such legislation, when tried, would be found inadequate, and would have to be strengthened. But it seems advisable to make haste slowly in a field where the opportunities for serious and costly blunders are so abundant.

SOUTHERN PACIFIC

THE Southern Pacific and proprietary companies operate a system of 10,311 miles of railroad, serving eight states, with a population of 9,590,000; the railroad employs approximately 54,000 men; and the ownership of this system is divided among 23,000 investors. The number of those who have money loaned to the Southern Pacific either directly through ownership of its bonds, or indirectly through the holdings of life insurance companies, trust companies, savings and other banks, must be many times the number of owners; the number of passengers carried in the single year 1913 was 42,000,000; the number of tons of freight carried, 31,643,000. The number of persons affected, either as consumers or shippers, by the efficiency and cost of transportation of freight on the Southern Pacific is no inconsiderable part of the entire population of the United States. It is well to review these facts briefly before making a study of the results of operation of the property in the fiscal year ended June 30, 1913, lest by stating the results only in figures representing dollars, ton miles and passenger miles, etc., the mere size of the figures will tend to disassociate them from the fact under consideration.

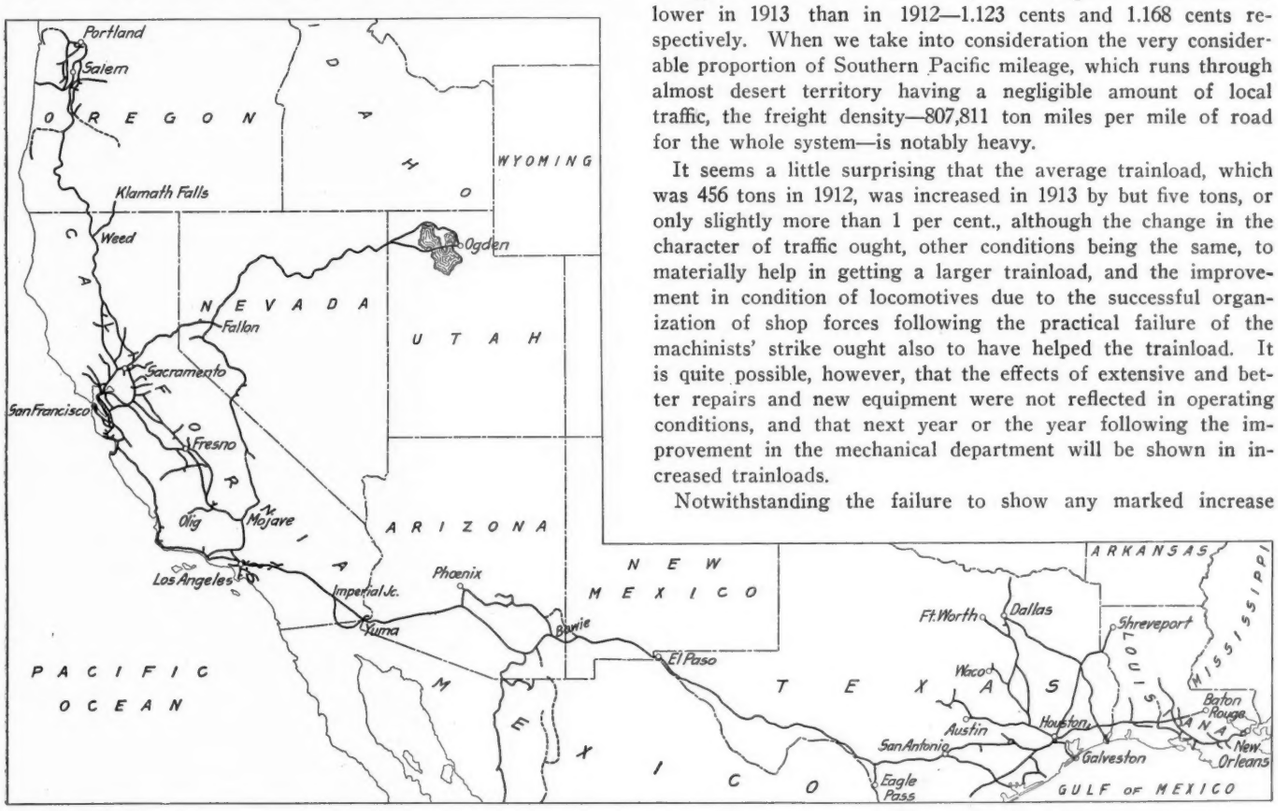
The *Wall Street Journal* a few days ago made an extensive study of operating and traffic conditions on a number of the most important western railroads, excluding, however, the figures of the Southern Pacific. The *Wall Street Journal* came to the conclusion that "in contrast with the previous year, the twelve months ended June 30 last were one of the best years ever enjoyed by the systems west of the Mississippi. Where in 1912 the comparisons of the results showed the effect of indifferent business, this year they afford examples of how the roads handled what was in many cases record breaking traffic." The Southern Pacific so far from being an exception to this rule is typical of much that is best in the showing of the combined statement for the important western railroads.

The mileage operated in the Southern Pacific system, as previously stated, was 10,311 miles, which include 341 miles, principally made up of the Arizona Eastern and the Corvallis & Eastern, not included in the 9,970 miles operated in 1912. This increase in mileage, however, is an increase of but 3.42 per cent., and total operating revenues amounted in 1913 to $142,775,000*, which is greater by $7,750,000 than the revenue in any previous year in the company's history and exceeded the total operating revenue in 1912 by $11,250,000, or 8.55 per cent. Spending 7.78 per cent. more for maintenance of way and 18.25 per cent. more for maintenance of equipment, total operating expenses in 1913 amounted to $98,567,000, or but 7.01 per cent.

*Including revenues from outside operations.

more than in 1912; and after paying taxes greater by 1.35 per cent. than in 1912, and interest and other fixed charges greater by 9.08 per cent. than in 1912, there was available for dividends $26,868,000, or 24.37 per cent. more than in 1912, and equal in 1913 to 9.85 per cent. on the Southern Pacific stock outstanding. Of this surplus the directors assigned to the owners in the shape of dividends $16,361,000 and invested in the property $10,507,000. This investment of surplus income in the property was more than twice as great in 1913 as in the preceding year.

The increase in gross business, both freight and passenger, is notable; but it is not surprising when all of the factors entering into the situation are taken into consideration. In 1912 the floods in the Mississippi valley very seriously affected the business of the lines east of El Paso, and the strike of machinists, boiler makers, etc., adversely affected the operation of the greater part of the system and was one cause of diverting business over other lines. The natural growth in the territory served piled up, as it were, during 1912 so far as the Southern Pacific was concerned, and the results in 1913 contrast so favorably with 1912, because two years' natural growth of the country were concentrated in this latter year. The purchase of the Arizona Eastern apparently had a marked effect on the character of the traffic, which was reflected all the more clearly in freight traffic figures because of the partial destruction of California citrus fruit and vegetable crops by frost and the widespread destruction of sugar cane crops in Louisiana due to the flood.



The Southern Pacific System

Of the total 31,643,000 tons carried in 1913, 10,939,000 tons were products of mines. This is 34.57 per cent. of the total; and the tonnage carried in 1913 of these products is greater by 3,653,000 tons, or over 50 per cent., than that carried in 1912. The bulk of the increase came in the tonnage of ores, which amounted in 1913 to 2,957,000 tons, as against but 593,000 tons in 1912. Just what part of this great increase in ore tonnage was brought about by the acquisition of the Arizona Eastern it is, of course, impossible to determine.

Products of agriculture furnished 5,833,000 tons of freight in 1913, or 18.43 per cent. of the total freight tonnage, whereas in 1912 products of agriculture amounted to 5,988,000 tons, or 22.22 per cent. of the total freight tonnage. Next to the increase of 50 per cent. in tonnage of products of mines the most noticeable increase was that in tonnage of manufactures, which tonnage in 1913 totaled 5,115,000, or 16.16 per cent. of the total freight tonnage, as compared to 4,579,000 tons, or 16.99 per cent. in 1912. Lumber is a very important commodity in point of tonnage on the Southern Pacific. In 1913, 5,135,000 tons, or 16.23 per cent. of the total freight tonnage, was lumber, and in 1912, 4,617,000 tons, or 17.13 per cent. of the total freight tonnage was lumber; the increase in 1913 over 1912 amounting to 11.23 per cent.

While freight revenue increased by 10.31 per cent., the tonnage of revenue freight increased by 17.41 per cent. and the ton mileage by 14.46 per cent. The average haul in 1913 was 222 miles, and in 1912 228 miles. As might be expected from the change in the character of traffic, the average ton mile rate was lower in 1913 than in 1912—1.123 cents and 1.168 cents respectively. When we take into consideration the very considerable proportion of Southern Pacific mileage, which runs through almost desert territory having a negligible amount of local traffic, the freight density—807,811 ton miles per mile of road for the whole system—is notably heavy.

It seems a little surprising that the average trainload, which was 456 tons in 1912, was increased in 1913 by but five tons, or only slightly more than 1 per cent., although the change in the character of traffic ought, other conditions being the same, to materially help in getting a larger trainload, and the improvement in condition of locomotives due to the successful organization of shop forces following the practical failure of the machinists' strike ought also to have helped the trainload. It is quite possible, however, that the effects of extensive and better repairs and new equipment were not reflected in operating conditions, and that next year or the year following the improvement in the mechanical department will be shown in increased trainloads.

Notwithstanding the failure to show any marked increase in trainload, and despite the fact that fuel costs were considerably higher in 1913 than in 1912, transportation expenses were much lower in proportion to business handled last year than in 1912. Total transportation expenses in 1913 amounted to $40,409,000, or 5.59 per cent. more than in 1912; and there was, it will be recalled, an increase of 13.68 per cent. in ton mileage carried and 2.61 per cent. in passenger mileage carried. Thus the unit cost of transportation was reduced.

One decrease in transportation expenses is worthy of special attention. Injuries, loss, damage and other casualties cost $2,126,000 in 1913, which is less by $103,000, or 4.60 per cent., than their cost in 1912. Carloading, which is often almost as important a factor as trainloading in helping to keep down transportation expenses, was 10.21 per cent. greater on the lines east of

El Paso in 1913 than in 1912, and 4.74 per cent. on the lines west. The average for all lines per loaded car was 21.32 tons, or 6.28 per cent. greater than in 1912.

Whereas transportation expenses, traffic expenses and general expenses together consumed 36.25 per cent. of total operating income in 1913, as against 37.26 per cent. in 1912, maintenance, including both way and equipment, consumed 26.76 per cent. in 1913, as against 25.56 per cent. in 1912. The following table shows the cost of maintenance based on certain units:

	1913	1912
Maintenance of way and structures per mile of first, second, third, etc., track, excluding sidings	$1,462	$1,411
Repairs per locomotive	4,721	3,800
Repairs per passenger train car	865	795
Repairs per freight train car	94	90

The increased expenses for maintenance of way are due principally to the large amount of rail renewal work that was done. More than twice as much was spent for rails, exclusive of the cost of the additional weight of rails replacing lighter rails, than was spent on the same account in 1912, and 639 miles of track were laid with new rails in 1913, as against 257 miles in 1912. Ties and ballast both show smaller amounts spent on their account in 1913 than in 1912, due presumably to the fact that ties and ballast used in repairing flood damage in 1912 made an abnormal cost for these items in that year. Maintenance expenditures are very high on the Southern Pacific and the equities of the owners of the property through earnings which have been invested in the property are very good.

The Southern Pacific, unlike all other transcontinentals except the Great Northern, has never been through a recivership. This is a fact the importance of which it is hard to overestimate in figuring the equities lying behind the common stock. When E. H. Harriman bought the Union Pacific he had to pour great quantities of new money into the property to bring it up to "Harriman standards." When he bought the Southern Pacific he obtained a property which had never been worn threadbare by an attempt to keep it out of the receivers' hands, but which on the contrary had had, beside enormous expenditures for additions and betterments which were charged to property income, the benefit for years of a quite extraordinarily liberal policy of maintenance and improvement from earnings. It is small wonder, therefore, that the property is able to recover from a strike and a flood so quickly and so completely.

The net expenditures in 1913 for additions and betterments to the system was $39,967,000. There was no change in the amount of the outstanding capital stock, and the net addition to the outstanding funded debt was $23,909,000, which is the result of the sale of $5,000,000 4½ per cent. equipment trust certificates and $20,000,000 one-year 5 per cent. notes and the retirement of certain outstanding securities. Cash at the end of the 1913 fiscal year amounted to $19,319,000, an increase of $8,106,000 during the year; and total current and deferred liabilities amounted to $40,751,000, a decrease during the year of $4,070,000.

The following table shows the principal figures for operation in 1913 and in 1912:

	1913	1912
Average mileage operated	10,311	9,970
Freight revenue	$80,141,499	$72,648,092
Passenger revenue	42,389,837	40,269,238
Total operating revenues	130,353,693	120,433,056
Maint. of way and structures	15,589,027	14,464,205
Maint. of equipment	19,295,725	16,318,141
Traffic expenses	3,115,079	3,201,367
Transportation expenses	40,408,954	38,270,811
General expenses	3,726,326	3,397,583
Total operating expenses	82,135,109	75,652,106
Taxes	5,697,286	5,621,239
Operating income	44,208,009	39,412,888
Gross income	55,950,181	48,265,408
Net income	26,867,807	21,603,153
Dividends	16,360,932	16,361,187
Surplus	10,506,875	5,241,966

Letters to the Editor

SHOP OUTPUT

Chicago, December 1, 1913.

To the Editor of the Railway Age Gazette:

On page 1018 of the *Railway Age Gazette* of November 28, you published J. H. Tinker's address before the Western Railway Club, at the last meeting. Mr. Tinker has, I believe, brought out a very vital point in regard to shop output, but I do not agree with his method of classification.

Unless some standard method is arrived at for the classification of repairs, it is almost impossible to determine how the output of the shop of one railroad compares with that of another. In reading this paper it appears to me that it would be well to divide the classification into eight groups. Four of these would be known as classes 1A, 2A, 3A and 4A, and would include thorough, general light and running repairs to locomotives with cylinders 19 in. or less in diameter, the classification of repairs to be governed by the amount of material used on each locomotive, which could be obtained by taking the output of thorough repairs of the various shops for one year, summing up the entire amount of material used on these repairs and dividing by the number of locomotives turned out that year, having thorough repairs. If this figure appeared to be reasonably near the correct one, it could be used to determine whether the engine received thorough, general, light or running repairs, as the case might be. For locomotives with cylinders over 19 in. in diameter, repairs would be classed as thorough, general, light and running repairs, and known as classes 1B, 2B, 3B and 4B and the amount of material used would govern as in the previous case.

My reason for making this suggestion is that the prices of material are more uniform over the country than the cost of labor, and for fixing a classification rate of repairs could, I believe, be used more conveniently than any other method. The end which is desired, is to obtain the greatest possible mileage from locomotives after they receive repairs. Quite often it is the case, especially with the heavier types of locomotives, that the cost of repairs which would be considered light on the smaller classes run so high as to be classed as general repairs. The general condition of the balance of the machinery would not justify the mileage being set back as would be the case on account of the amount of money expended, classifying the engine under general repairs, so that it may fall as much as 20 per cent below the desired mileage.

While I realize that if this were done, it would mean a decrease in the shop output of general and thorough repairs, I believe, taking everything into consideration that it would be a fairer arrangement than the one which now exists.

Shop Superintendent.

Liverpool's Dock and Warehouse Streets.—In an address delivered at Liverpool University on December 12, Mr. J. A. Brodie, the city engineer of Liverpool, remarked that Liverpool had, on its line of dock and warehouse streets, some of the heaviest traffic in the world. Granite setts have stood the test of time, but if the cost of labor and other material continues to increase as it has done it will soon be possible to say that these streets are paved with gold, for the cost is fast approaching $5 per sq. yd. of surface. Mr. Brodie advocates a high level bridge across the Mersey and an increase in the speed of electric cars. To provide for the latter he advises a wide road so that a portion of it might be railed off for the cars. He also advocates special roadways for heavy motor traffic between the city and neighboring manufacturing districts.

The Everyday Life of the Locomotive Runner*

Personal Narratives of a Score of Engineers; Men With Gray Heads and Long Records, but Young Minds

The Brains of the Engine.—Run your engine; do not simply open the throttle and let her run herself; that is costly for the company and man-killing for your fireman. Take an interest in your work, above looking for the end of your division and pay day. Any engineer who appreciates the position will find a pleasure in his work and things will come easy. Learn every inch of your division; know what you can do, how fast you can go; and set an example to all others of what a self reliant man is capable of.—*J. F. Lawrason.*

An Imaginary Guard.—The simple rule that I observe to prevent the involuntary wandering of my mind while on duty, is to regard my mind as being one large enclosure, with only one entrance and a guard stationed at that entrance, with rigid instructions to keep out the thousands of intruding thoughts that crowd around trying to get in. Observance of this rule will soon teach how to concentrate the mind. Intruding thoughts have been the direct cause of many big railroad disasters. The imaginary guard comes off of duty when I do, and another one takes his place with less rigid instructions, giving my mind a chance to relax.—*B. M. McCleskey, Southern Railway.*

Use Your Ears and Nose.—The engineer must know through his sense of hearing that all parts of the engine are performing their functions. On one occasion I was running about 35 miles an hour when I struck a torpedo and got a flag. When I shut off I thought I heard a slight click in the engine. After drifting about a mile to where a work train was I got a signal to come on. Starting the engine I found her working only one side. I stopped and found the pin that holds the rocker arm to the valve stem gone. I remembered that slight noise I had heard and I took a brakeman and walked back to the place, found my lost pin, replaced it and was going again in 22 minutes. No other pin could have taken the place of this one. The sense of smell also comes in play. I was running a special tea and silk train with orders to make the best time possible. I was making 45 miles an hour, around curves, and it was a very foggy morning. My nostrils commenced to tell me that a train was close ahead. I could smell the smoke, which is cognizable a long distance in such weather. I got my train under control; and suddenly out of a bank of fog I came upon the rear end of a slow moving extra freight. I followed this train into a water station, 3 miles, without the crew in the caboose knowing I was near.—*J. F. Lawrason.*

Competition in Recklessness.—One great factor jeopardizing the safety of human lives and the security of railroad property is the natural greed of one human being to best the other man. An engineer will be told, by an officer, of what some other engineer has done. (A greatly exaggerated tale.) Some engineers listen to this talk and try to emulate the actions of this daredevil, nervy, good (?) engineer. Once out of a hundred times he might get by with it; but there are ninety-nine chances against him. If he does not get by with it you hear them say, "Yes, he was buried yesterday; too bad; John was such a nice fellow."—*E. Schoonover.*

Emergencies.—Where is the safest place on an engine when a smashup is impending? You won't think so much of that when you are running an engine; all you will think of is to stop; but to the fireman, who has nothing else to do but look after his own safety, I would say, "Stay with her," unless your speed is low—say less than 25 miles an hour, and you have plenty of time to get off and away from the track. Many a man has been killed by jumping and having the cars pile up on top of him. Again, many have been killed by being caught between the engine and tender as they went to get off; the safest place, is out on the running board, hanging on to the hand rail; then if she goes to turn over, you have a jump coming. Rounding a curve once, on a down grade, and at a speed of about 40 miles an hour, I saw a tree across the track; and it was impossible to stop. I called to the fireman, "Look out!" He saw the tree, and putting both legs out of the side window, he prepared to jump; but I was quick enough to grab him by the jumper and I pulled him back into the cab. He would undoubtedly have broken his neck had he jumped. We struck the log, smashed our pilot, and broke the log in three pieces; but after a stop we went safely on.—*F. Henry.*

Joking is Dangerous.—Don't play practical jokes while on the engine. There was a conductor I once ran with who had a habit of yelling out, "Jump off," when any little thing occurred out of the ordinary. One night while running at moderate speed the cylinder cocks were broken off by a beer keg which rolled off a platform, and, for a change, I yelled "Jump off!" The conductor, who was riding on the engine, jumped up, and before I realized his intention, and could prevent his doing so, did jump off. We picked him up and took him to the hospital. He soon recovered, and was completely cured of his habit of yelling "Jump off." On another occasion, a fireman on a freight train, noticing that the brakeman, who was sitting in front of him, was dozing, got the red lantern and, going on top of cab roof, held it down in front of the window and then yelled at the sleeper. The brakeman, waking suddenly and seeing the red light, sprang to his feet and shot out of the gangway, believing the engine was about to collide with the rear end of a train preceding them. He escaped with a broken leg and a few scratches.—*F. Henry.*

Making Up Time.—"Is it advisable to make up lost time when on a fast schedule?" No. Why not? If you are running on a schedule of say, 50 or 60 miles an hour, and are delayed for some cause, I would not advise making up the time, unless there is some place where you can do it without exceeding the fastest time of your schedule. You may be permitted to do so, but I much doubt if you will ever be instructed to do it. If you have an accident you will certainly be held responsible for it, and will be charged with running at an excessive rate of speed. Remember this; a modern train equipped with high speed brakes, going at the rate of 80 miles an hour, will, at the end of 1,100 ft. after application of brakes in emergency still be making 60 miles an hour; whereas if you are going at 60 miles, when the brakes are applied, you will come to a dead stop in the 1,100 ft. By being too free to make up time you will be a "good fellow" with the train crew, and with the despatcher, perhaps; but you will, at the same time acquire a reputation with the officers as a reckless runner.—*F. Henry.*

The "Human Equation."—Recently an engineer of a passenger train ran off a derail at a drawbridge. I questioned him in regard to the circumstance, and asked him, how he came to do it. Didn't the brakes hold? Or did you underestimate your speed and stopping power? He replied, "To tell the truth, I hardly know how it happened; I was looking right at the semaphore; I saw it was against me; but somehow the sensation did not reach my brain, so that I could act on it; guess I was thinking of something else at the time." This, I consider, is the greatest danger an engineer has to guard against. This is "the human element" we read so much about after an accident. After you have run an engine for some time, you will get to do your duties automatically; and you can pull off a pretty good stunt while still being careless. You can run along, thinking of something

*This is a continuation of the series of articles giving the experiences of American locomotive runners, which was begun in the *Railway Age Gazette* of November 14 last and continued November 28 and December 19.

entirely foreign to the matter in hand, doing your work automatically; but some day the signal will be at stop; your eyes will see it, but your mind won't grasp it; and your wife is a widow. Therefore, I say, fight against the tendency to think of other things than your work.—*E. H. M.*

Reprimands Inopportune.—An officer should never say anything of a reprimanding nature to an engineer while the engineer is on duty. It might worry the man and cause him to forget something that would lead to an accident. An engineer should never go to the company mail box just before going out on the road, but get his mail when he comes in; for if he should receive a letter reprimanding him for something done on a former trip it might divert his mind from the duties of the trip he is just commencing. Receiving such a letter when he comes in, he will go home and sleep over it, and probably his mind will be cleared before the next trip.—*D. H. F.*

Despatchers' Duty.—The writer recalls an occasion when he was running a light engine over the road, which made it necessary for him to go to the offices to get orders, check train registers, etc. He was checking the train register at a junction point (had been there then less than a minute) when the operator said, "the despatcher says for you to hurry." He told the operator to tell the despatcher he was hurrying all he was going to; that he was going to check that train register carefully and try and know just where he was at, with regards to opposing trains, before he left that office. Despatchers should not be allowed to send such messages to an engineer; it only tends to lead to mistakes being made.—*D. H. F.*

Nagging and Favoritism.—A great many signals are overlooked by reason of absent mindedness caused by domestic or other troubles that occupy the mind; also because men will run over a road that they are not acquainted with. Some men are not resourceful and every little thing annoys them. If they are nagged by the trainmaster the result will be that they will take chances. The trainmaster will say that men are not disciplined for not making time; but if you don't make time they will put some other man on your run for a week or so. Then when you try it again and you don't win out you will be relegated to the freight yard. If this course is not equivalent to offering a premium on recklessness I cannot see what is. Suppose they are making repairs to the track in two or three places and there is an order to reduce speed to ten miles an hour over these places; the man who comes in on time in spite of this, is never questioned; the other man, who is living up to the rules and loses some time is counted no good. Every man employed in train service should be examined as to common sense. They examine a man's eyes but not his thinking faculties. Flagmen should be drilled. They never give a gun to a soldier and tell him to go and shoot; they drill him. There is too much in the book of rules that is not necessary. Collisions are caused by different men interpreting orders differently. All serious accidents should be made the subject of a report and the causes explained to the men so that they may learn from other men's experience. The red flag is in evidence too much; it is not held sacred enough. It should not be displayed so much when not intended to stop trains.—*C. J. Y.*

A Considerate Officer.—This subject of safety should have been taken up long ago. Two-thirds of the accidents are due to poor judgment and lack of self confidence. Sometimes being hounded by some under official for a minute or two, which is a daily occurrence, will be the cause. Some engineers take this hounding to heart; others go on as if it had never been spoken. Much discipline has grave defects. Although I never had the experience, I have observed the man who is suspended. When you meet him the first word is the suspension. Every thing connected with his case has to be discussed. His mind is greatly disturbed. A word of encouragement and good advice from an officer is as gold. I had the experience when a young man. I broke a pair of draw heads on a coach; the superintendent recommended three days' suspension. I told him that that would not do me any good. He admitted I had a good record; I asked him not to spoil it. He withdrew the suspension; hoping he would not see me again for at least a year. He has not seen me on the carpet since, and that is 12 years ago. He told me then that he did not sleep while some engineers were out on the road. I shall never forget that superintendent's words. It touched my heart. To think that a man lay awake because the right man was not on the engine.—*John Driscoll.*

Train Your Fireman.—Always look out for the other fellow, never depend on the other fellow looking out for you, even if you are on the train which has the right of track. The careful engineer will get into the habit of observing switch targets and switch lights as soon as he can, so that in case the switch is left wrong, it will be noticed in time to stop the train. . . . The engineer should educate the fireman to watch ahead through stations and on curves on the fireman's side. This assists the engineer greatly in making up time, and still taking the safe course. It is surprising what a difference there is in firemen in this respect. Some firemen seem to understand this question of watching ahead, at first sight, while others constantly forget. This kind of a man has not got the ability to master his work. It is an important point when hiring men to avoid the inferior class. If a mistake is made in hiring a man get rid of him as soon as possible. Do not wait until you want to make an engineer of him, and then find that you have nothing to make an engineer of.—*H. Jones.*

Fireman Must Co-operate.—The engineer's mind is no more infallible than any other human mind and the engineer must depend on his fireman and demand that he at all times keep in touch with him on train rules and movements. The engineer must consider the fireman as his able assistant. It would have been well in many cases had the engineer, prior to some accident, consulted with the fireman. The engineer must not give the impression to his fireman that he (the engineer) is infallible. This will cause the fireman to be lax in thought as to the safety of the train.

On one occasion train No. 70 eastbound, fourth-class, had an order to meet train No. 99, third-class, westbound, at Dorsey. The name of the station east of Dorsey was Dorchester, about 11 miles away. It being night, and as our scheduled meeting point was Dorchester, I was under the impression that the train order read Dorchester, possibly because of the similarity in the names. This was of course an oversight on my part. At Moro, the station just before reaching Dorsey, the fireman, true to instructions, announced that we were to meet train No. 99 at Dorsey. I, of course, contradicted him. After looking at the order again I had to acknowledge my mistake. I know that my practice of making the fireman feel the importance of keeping informed has been a good thing for myself and everybody concerned. The same holds good in regard to announcing signals, and repeating them back to the fireman. My instructions are that in case I do not answer, the fireman should repeat and see that he receives an answer.—*W. C. P.*

An Alert Fireman.—A green fireman should always be carefully instructed. When he is green is the proper time to teach him. I had one experience of this in the winter of 1903 with a fast freight. I had instructed my fireman that if anything should happen to the train or engine to pick up his red and white lamps and flag opposing trains on the other track. A journal was cut off on the left side, 12 cars back from the engine, while running about 40 miles an hour down through Skillman. The brakes applied, and the car fell over on the westbound track. This fireman being a green man, I at once called to him, as I knew westbound train 515 was overdue—a midnight express of about 10 sleepers and coaches. But he had already jumped off with the lamps. He was not a second too soon, for the pilot of the passenger engine did not stop until it was up against the broken car. That fireman is today a successful engineer. All the little rules are necessary for safety.—*John Driscoll, Philadelphia & Reading.*

Providential Guidance.—I believe I learned the foundation of the habit of keeping a good lookout when only a boy fireman,

sixteen years old—my attention being called to it first by my father, for whom I fired. I think it would be wise if the officers and engineers should demand this of firemen at all times when on the move. After I clearly was shown the necessity of a sharp lookout, I cultivated the habit as the years went by, until it really become second nature. I have been running fast trains on the Erie over 30 years, and have a clean record without even a suspension. . . . On one occasion, which I recall, we were coming down Lima Hill with 12 cars; a fast express, and a big load of passengers, about 1:30 a. m. It was between stations with nothing in particular to keep looking out for, some might say. But every once in a while I saw, far ahead, a few sparks fly off to the right of the track. But piles of old ties often get afire, and for these we never stop. However, I spoke of the matter to my fireman, who laughed at me for shutting off and applying the brakes. Of course we men of the railroad cannot deny that sometimes Providence itself seems to guide and handle these crises; and this we all felt when, after an emergency stop, we walked ahead no more than an engine's length to a completely burned out bridge with the ties hanging down over the bank. I shall always feel that if I had not been watching ahead with keenness we should have all plunged into that dry riverbed and been burned up.—*L. F. Truman.*

Rule G.—The writer remembers when he first commenced railroading, 27 years ago, a great many trainmen thought they could not start out on a trip without having several drinks of liquor under their belt, but I am glad to say that there is very little intoxicating liquor used by the locomotive engineer of today; and I believe its use could be almost wiped out entirely, if the railroad companies would inaugurate a campaign of education along this line, by posting and distributing literature, showing how destructive to the human body alcoholic liquors are.—*D. H. F.*

Sundry Details.—Have all operating levers in the cab, such as throttle lever, reverse lever, injector throttles, whistle lever, track sanders, and air and steam gages, and the water glass in such a position that they can be seen and operated by the engineer from the position in which he has a plain view of track ahead. The headlight should show a fairly good light at least 1,500 ft., and it should be arranged to adjust itself to curves. Cab lights should be so arranged as not to shine in the engineer's eyes, or throw shadows or reflections on windows which he sees through. There should be a light in a convenient place in the cab so that the engineer can read train orders and timetable. All fixed signals should be arranged so that they can be seen from a reasonable distance, and the lights on them should be focused to suit curves. The engineer on trains of a fast schedule should not be held responsible for any hot bearings on cars, as this would have a tendency to draw his attention to them and away from the lookout. No one should be allowed to reprimand the engineer, while on a run, whether for rough handling of train, bad stops, not making schedule time, for exceeding speed restrictions, or any other failure on the road; these things should be handled by the proper officer at the end of the run. The best way to educate engineers to keep a constant lookout, is for surprise tests to be made by the officers of the road. On some roads the rules require the engineer on freight trains to receive a proceed signal from the rear of the train, on approaching all stations. This, in my opinion, is a dangerous practice, as it requires the engineer to be looking back at the time it is most important for him to see the track and signals ahead.—*F. W. Corcoran.*

A Bit of Poetry; and a Look out of the Side Window.—Oh! the weary eye-straining look out; what queer colors the fog takes. From being milky white, it gets to be gray, and if the preceding train is not far away it becomes black. Then it forms into huge gray turreted castles or immense mountains of snow. Sometimes it looks like a black tunnel through a sea of white. Even the daylight has little effect, until perhaps climbing a grade you get into a higher altitude and out of milky chaos. Then Paradise appears! The sun is shining, the fog has gone and from every tree, leaf and shrub diamonds are glittering in the glorious sunshine, it is perfect day and an awful nightmare has taken its silent departure.—*George Martindale, London, Ontario.*

Experiences in Virginia.—I once held a lap order. It gave me 20 miles right of track over the opposing train holding the same right. I made a stop for water and had started my train; I happened to look back and I noticed a hand signal about 15 car lengths back, near the telegraph office. I stopped. The operator came out and said "I heard your order sent over the wire different from the way it reads here." So we investigated with the despatcher and found the operator correct. Strange to say, two other hazards, somewhat similar to this, have occurred in my experience, and in all three instances the same engineer was on the opposing train. It looked as if we were to get together in some way; but we are still running in the same service, and meeting each other every night. Always be on the lookout for the other fellow. On a passenger run I had a butting collision with a through freight in one of those long yards where the limit posts are from three to six miles apart. The time of my train, which for years had been the same, had been changed about a week or ten days before and made five minutes earlier. It developed that a number of the freight men had not noticed the change. Once in the rush of business a new crew was sent out on an extra freight. I was on a time freight loaded with watermelons running in the opposite direction. As I rounded a curve going into a station I saw a headlight that had not yet got to the switch. I had to get busy and stop to give the other fellow a chance. With long yard limits a runner must make his time on the open road. In my long experience (28 years) I have run into three open switches; but with little damage. In all my service as a locomotive engineer I have no recollection of a passenger being hurt on any train that I handled.—*Kenneth Smith.*

FORTY-SEVEN YEARS' OBSERVATIONS IN ARKANSAS.

By Robert Heriot.

While phrenology is looked upon as only a pseudo-science, I believe that it is so useful in determining the natural endowment of individuals that if all candidates for the position of fireman were required to pass a phrenological examination, especially as to form, size, color, memory, locality, and other brain qualities, of course including physical development, it would prevent many square pegs being placed in round holes. These qualities of brain constitute what is known as good judgment, without a modicum of which an engineer is a failure. . . . Young engineers, when assigned temporarily to a fast and important train will naturally take more chances to make time than would a more experienced man who has already acquired a reputation. The trouble with many engineers is that they have not the moral courage to be criticized for being slow, and yet it must be said, nevertheless, that if an engineer doesn't take some chances, he will prove to be a failure.

On one occasion, when running as second section of a freight at night, just before daylight, I stopped at a station about 12 miles from the end of my run. For a mile in the direction I was going it was down grade, and at the end of the mile was a very short curve, and on this curve a high bridge over a bayou. Up to this time I had not seen the first section for more than a hundred miles, but just as I stopped at the station, I heard the faint toot of a whistle in the direction I was going. It sounded only once, and was indistinct. I dropped down the grade very cautiously, with train under perfect control; and on rounding the curve, discovered the caboose of the first section standing on the bridge without a flag out. Of course, if I had not been keeping my ears open, the road would have been blocked and the wrecker sent for.

It is an every day occurrence for a fast train to encounter a hand car on the track. The section men become very expert in removing their cars from the track and it never causes the enginemen any uneasiness. As a general thing, we don't have

to slacken speed for them. But on one occasion we saw a hand car on the track ahead of us, and something said—"Stop! they are not going to get off!" I slowed down and even whistled at them. They paid no attention to the whistle. I ran up, with train under perfect control, to within 30 ft. of them and stopped before they saw the train. They nearly broke their necks falling off the handcar *after we had stopped.* There were eight men on the car. I can't give any reason why it struck me that I had better stop.

One great danger constantly met with is a multiplicity of train orders; instead of being long and numerous, they ought to be short and as few as possible. An engineer should always check his train orders from his clearance and read them in consecutive order and not allow any one to drive him ahead until he was thoroughly read and understood them.

The road that the writer is employed on, the St. Louis, Iron Mountain & Southern, is operated under the manual block system, and with ordinary care by the employee, there is no excuse for a collision. When we look back at the old way of running trains, before the block system was adopted, it seems miraculous that we had so few collisions. The federal government should, in the interest of safety, compel every interstate railroad in the country to adopt some form of the block system. Just think of running passenger trains in two or three sections ten minutes apart, and in some cases, only five minutes, during snow storms, rains, and foggy weather!

MAKING SMOOTH STOPS; WATCHING FOR TRESPASSERS, ETC.

By Michael O'Connor,

Southern Railway, Knoxville, Tenn.

After completing the 10th grade course in public school I secured a job as wiper, and from that to fireman. There was no seniority in those days among firemen; if an engineer wanted a man he could get him. I was soon promoted to running a yard engine at night. This was in April, 1890. I had only fired two years and five months, and was only twenty years old at that time. This experience in yard service taught me that it is not altogether safe to take signals as they are given by switchmen and others, as it depends a good deal on the kind of humor they are in, what kind of signal you get. This made me very cautious, then and afterwards. The link and pin couplers were used then and for several years afterwards, but I never have hurt any one, and I attribute this to the fact that if I did not know the conditions—I mean where cars were located, etc., I would take my time, regardless of signals given by anyone.

After four months' service in yard I was promoted to freight service and like a good many others was a little wild, on the start and for some time; but a few close shaves took a good deal of the speed out of me. This was in the days of hand brakes, and it was something of a job to keep out of trouble.

Every runner when he gets on passenger feels a sort of suppressed excitement, as it were. He thinks, "Well, it is up to me to make good;" and nine out of ten men will make asses of themselves repeatedly until this excitement wears off. So it was with me. The new man starts out as though he were going to New York in about thirty minutes; and when he has to stop, of course he wants to make a grand-stand stop; but when he does stop the rear sleeper generally brings up with a bang opposite the baggage platform. After he has backed up to where he should have stopped at first, and sees the conductor and also the station hangers-on, etc., looking up at him, then, indeed, he is aware that he is a sorry mortal, and wishes old High-pocket had stayed on the job. Of course this is time lost; and to regain it he stretches her out again; and before getting to the next stop resolves to go slow in making the stop. Result: stops short, with about same results as when he ran by. I am illustrating these conditions because it takes time to learn all these stops. Braking on passenger is entirely different from freight. It takes a month or so to get it down pat. All regular men on passenger have at every station some mark to stop at for the different trains they handle; and a good brakeman will very rarely miss them even by a few feet. It is a great factor in making time to be able to do this; but it takes experience, and above all, confidence. Hence the regular man's advantage over the extra man.

The next thing to do is to get a steady gait and a safe one. Hundreds of the best men do this; they hold a steady gait so that under usual conditions it is not necessary to look at your watch for a hundred miles or more; the same gait every day.

This old fallacy about an engineer worrying himself about getting his passengers through safe is all bosh. If he has the confidence that he fully knows his job I am sure that he does not worry about them. Therefore my view of safety is a steady gait consistent with the condition of track, roadbed, etc., and a close observance of signals. If you can't see them, stop. Have men on regular runs with regular engines and a first-class fireman, who can be depended on.

Another factor in making time and not by any means the least is a good conductor and crew; a conductor who is on the ground as soon as the stop is made and who knows just how many passengers are to get off. On the other hand we have the handshaker, who the minute he gets off the train turns his back to it and goes to gabbing with the natives. Such men as this get back into the cars and after taking tickets go to reading a paper, and when you blow for the next stop, a flag stop perhaps, will pull for a stop, get down on the ground after stopping and then find that they have no one for that place.

I long since learned that a very moderate gait is best through yard limits. Run slow enough to easily stop where you cannot see. If foggy, run the entire distance through yard limits under perfect control. I know I have avoided many accidents by this course. The chances are that some one sooner or later will forget you are due. If you have an accident in yard limits it looks bad at best. I made up my mind that if I could not make the time out in the country I would not use the yard for a race track.

In the matter of trespassers, this road is alongside of a river, which, being very swift, makes a lot of noise, so that it drowns the sound of a train running, and I blow road crossing signals often in rounding curves. If the wind is blowing against me I blow two or three times when approaching crossings. Parts of the road at both ends of my run are double track and going through factory districts there are lots of workmen on the tracks. If I see another train coming in the opposite direction I reduce speed, sound the whistle frequently. I have occasion to know that I have saved several lives by this course. Carelessness on the part of employees kills lots of people. Take a switch engine on double track going in a direction opposite to that of an approaching passenger train. Every man of the switch engine crew is looking at the passenger train to see who is on it, instead of looking ahead. I have seen several killed this way. It should be the rule that, under these circumstances, on the approach of the passenger train yard engines should stop, until the train has passed; a matter of only a few seconds. Where freight or passenger or both are approaching on double track in opposite directions in city limits in congested districts, and where factory hands use tracks to walk on, each of these trains should be under control, prepared to stop. Certainly every engineer should grasp the situation and slow down immediately and stop if necessary. I have done this and shall continue to do so.

THE DEPENDENCE OF TRANSPORTATION IN INDIA ON RAIN.—It has been said that the transportation of freight in India is truly to be called a gamble in rain. Excessive floods stop the service entirely because of washouts. A long-continued drought after a time diverts food, grain and fodder from their usual channels for the famine district. If the season is normally favorable labor is diverted onto the land; factories and mines can only be kept going with difficulty and the getting and distribution of coal becomes erratic in the extreme. A short while ago Bengal was suffering from an acute shortage in coal cars. At the present time there is just as decided a surplus, the reason being that credit is bad and dealers are withdrawing from contracts.

Certain Considerations in Railway Rate-Making*

Accounting and the Approximate Standard for Adjustment of Charges—Need for Better Cost Accounting

By Balthasar H. Meyer,
Member of the Interstate Commerce Commission.

It is my practice to preface remarks on occasions like this with the statement that I appear in a personal and unofficial capacity. No one who may be interested in proceedings pending, or which may hereafter be instituted, before the commission of which I am a member, need have apprehensions that views and opinions expressed in this paper in any respect prejudice different views or opinions which he may wish to urge before the commission, so far as I am concerned; and, of course, my colleagues on the commission are not speaking through me on the present occasion.

I ask you also to please observe the restrictions suggested by the title of this paper. There are those who either have themselves or want others to get for them, a definite and fixed standard of measuring a railway rate just as a tailor measures a piece of cloth. I, too, would like to have the yard-stick if only I knew how and where to get it. I shall hope to be able to contribute a few constituents which must enter into the making of an approximate standard, at least a partial realization of which conditions of today permit. I must disappoint you, however, if you expect me to deliver it ready made on this occasion.

AIM AT APPROXIMATE RATE STANDARD.

Nevertheless, I believe it is possible to approximate a standard in rate-making much more than has been done in this country in the past, but the kaleidoscopic nature of the facts which enter into a particular rate problem will probably always defeat every attempt to impose a uniform rate rule upon the traffic of today throughout the United States. Were we standing at the threshold of the industrial epoch which brought the railway and modern manufactures, with none of the industrial relations of the contemporary structure of society established, a very different problem, and, consequently, also a very different solution, would be presented. The standard which I expect to see develop more rapidly in the future than in the past is a certain approximate standard applicable to normal or typical conditions from which variations will be made in the light of the concrete facts in each particular case.

The question of railway rates embraces elements which are perpetual and which doubtless inhere in every industrial society which employs the railway as one of its instrumentalities. As long as rival individuals engage in trade, offering the same or competing commodities, placed upon the market by competing producers and sought by rival consumers, and any or all of these believe transportation charges to be excessive or discriminatory, the railway rate problem will continue to exist. The present system of private ownership and system of regulation may give way to different systems of regulation, and these in turn may be superseded by a system of public ownership; but none of these will terminate rate controversies. Changes in ownership and systems of regulation and administration may eliminate some rate questions; they will with certainty originate others, and the rule or rules which suggest just settlements today may have to give way to other rules which the conditions of the future may require. The doctrine of relativity applies also to transportation.

RAILWAY RATES AND IMPORT DUTIES.

In dealing with railway rates we come in contact with nation-wide interests and forces, and, indirectly, and perhaps involuntarily, also with international forces. Under the law our appointed jurisdiction in the United States may stop with ocean, gulf and the forty-ninth parallel; the economic effect of our action often goes far beyond. Considerations of this kind have led those foreign countries in which the railways are publicly owned to view their respective industrial policies as a united whole, of which the railway is a part. The administration of the railway is there made an instrument in shaping commercial policy. Railway rates and customs duties are frequently treated together, and rate making is conducted in harmony with the customs policy of the country. In the United States, customs duties and railway rates have as a matter of law always been strictly divorced. Whether railways will be permitted in the future through the rates of transportation which they prescribe to augment or diminish the rate of import duty imposed by the federal government, only the future can reveal. It will probably depend upon the wisdom and discretion with which the power of making railway rates will be exercised in this respect.

COMPARATIVE RATES.

It has long been customary to establish rates in the light of certain checks and comparisons. This has apparently been done on the theory that if numerous other rates can be cited which are applicable on the same or similar traffic, under substantially similar circumstances and conditions, a rate in harmony with such illustrations is likely to be just and reasonable. Comparisons of this kind when restricted to small areas, such as a single state, are rarely satisfactory, but when they extend over a number of states, or embrace the entire United States, including numerous rates which are the result of competition between carriers, water and rail, while not necessarily determinative are, nevertheless, of sufficient interest and value to command respectful consideration if not confidence. In the absence of better measures and checks this is one of the most useful expedients. Its intrinsic value depends, of course, upon the manner in which the rates drawn into the comparison have been selected, and the influences and forces which united in originally establishing them.

COMPETITION IN RATE MAKING.

This suggests the element of competition as one of the considerations in the making of railway rates. There are survivals of the competitive rate, but the merest novice in the railway history of the leading countries of the world knows that competition alone has nowhere permanently secured to the public reasonably adequate service at reasonable rates, and that in consequence practically the world over the competitive theory of railway rate making has been abandoned. Where it does bring benefits to the public, competition is capable of producing better results than the best regulation. To what extent competition survives in railway rates or service today and what benefit the public may derive from it, lies outside of the scope of this paper.

VALUATION AND SECURITIES.

Perhaps the most important single factor, now unknown, which will enter into the consideration of railway rates in the future is that of the value of the property. Theoretically, it has long been considered by commissions and courts, but in practice its application has been limited to isolated valuations or partial valuations made under different, if not mutually exclusive methods varying in degree of thoroughness and applied almost exclusively to meet allegations of confiscation of property. In the not distant future we may hope to know what the fair value

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or final value of our railway properties is, whatever these terms may be made to include. In the past attempt has been made to appeal to the volume and market value of outstanding securities with the view of having them considered as evidence of value to support a rate or rate structure under attack. In the future, after the valuations have been made, similar appeals can have little weight. Once the value of railway property has been officially established, and power to regulate service and rates co-extensive with the railway business lodged with competent administrative authority, the issuance of securities by railway corporations becomes a question of public morals. The public eye should be directed toward the value of railway property as determined under the valuation statute rather than to the market value, face value and number of pieces of paper which may have been circulated to represent the property.

If there are people who prefer many pieces of paper, each with a smaller value, to fewer pieces of paper, each with a larger value, we may well permit them to gratify their whim, provided no burden is thereby imposed upon the rate paying public. As a matter of good morals we should prohibit as far as possible and make difficult the circulation of bad securities. We should legislate against the exploitation of the undiscriminating public when its speculative traits are appealed to, but under no circumstances should we recognize these engraved pieces of paper as the equivalent of property in the making of railway rates, or perchance, validate them through ill-advised stock and bond legislation. The country urgently needs stock and bond legislation; but it will be better to have none than accept much of what is being proposed. What consideration, if any, should be given to securities issued in the past by railway companies in the valuation required to be made under the valuation act, is a matter which I cannot discuss with propriety at this time, and regarding which I shall express no opinion; nor should anything which I have said herein be construed as an intimation of what I believe the final conclusion upon this question ought to be. But what I am free to say is, that the task of valuation having been accomplished, outstanding securities against the valued property should not receive the least consideration in the establishment of rates to be collected for the public use of that property.

As suggested before, with adequate legal provisions and effective administration covering value of the property, service, and rates, the public has no interest in railway securities except as a matter of morals. These moral purposes should be promoted and achieved to the fullest extent possible through legislation, but great care must be exercised lest this legislation may by inadvertence or design make the value of securities a basis for rates with the possible consequence of imposing untold and utterly needless financial burdens upon the present and future generations of rate payers.

COST OF THE SERVICE.

A second factor equally fundamental with the value-of-the-property factor, which I believe will be employed very much more in the future, is that of the cost of the service. A great variety of statistical analyses have heretofore been made, but systematic efforts directed toward the ascertainment of the approximate cost of the service have, generally speaking, been strangely neglected. A small minority among those dealing with rate problems have long advocated it, but their plans have been thwarted by the skepticism and unwillingness of a persistent majority. There are those who have opposed the development of statistical investigations along the lines of cost because they assert the results are bound to be misleading and unreliable. Others confess a fear that information of that kind will be misused. Others declare that it will result in the establishment of rigid distance tariffs, with attendant chaos in the industrial world. Still others maintain the view that the cost of the service has nothing to do with the rate either in general or in particular. The combined weight and influence of all these objectors has thus far been sufficient to obstruct substantial progress.

GROWTH OF COST ACCOUNTING.

It is a fact of common knowledge that so-called cost accounting has been applied to every important branch of industry except steam railway transportation. A prolific literature upon the subject has been produced within the last decade, and competent specialists in all branches of business are prepared to give these principles practical application. The railways themselves have made limited application of the principles of cost accounting to more than one-half of the railway mileage in the United States. They declare, however, that this has been done for internal corporate administrative purposes rather than with a view of assisting in the establishment of just and reasonable rates. The difficulties of separating operating expenses among the various branches of the railway business are as apparent as the benefits of the final results are clear to those who are willing to undertake the task. It is perfectly obvious that controversy respecting the apportionment of maintenance of way items, for instance, can never end. Is this, however, sufficient reason for refraining from undertaking a work which is so promising in beneficial results? There exists surprising similarity in the methods employed by different railway companies in apportioning certain common or overhead expenses. This similarity appears to have been brought about without previous conference and agreement and is apparently the result of similar conclusions arrived at by men working at the same problem independently of one another. However, I am not suggesting that methods and rules which are now found to be common to several railway accounting departments are necessarily those which commissions should accept or prescribe. If cost accounting is not to be applied to railway transportation until every refinement has been settled by unanimous consent of the accountants, we shall never get anywhere. Institutional reforms are rarely effected from within and the railway is no exception. If such a rule were to be applied to the assessment and collection of taxes the government of every civilized country in the world would be obliged to cease its activities for want of revenue.

PRACTICAL APPLICATIONS.

A new system of express rates is about to be put into effect throughout the United States. It inaugurates a revolution in the conduct of the express business. It is a carefully considered experiment, the exact outcome of which no one can predict with full confidence. How will anyone be able to draw a conclusion at the expiration of a definite period of time regarding the financial results of the operation of the express companies without approximating a segregation of the expenses incurred by the railroads on account of the express business? Railway mail pay is the object of periodical controversy. Does not that involve essentially the same fundamental accounting questions? Passenger rates are an issue in different states in various parts of the country. How can these controversies be properly and justly settled without some reference to the cost of conducting the passenger business? One might suppose that the railways in this country would fairly vie with one another in producing the most scientific cost data in regard to their respective operations which the best talent can compile. With a few conspicuous exceptions, the exact contrary is the fact.

I have commented upon the cost of service as a consideration in rate-making only. This entire paper might advantageously have been devoted to railway cost accounting as a test of efficiency and economy in operation; and after it has been ascertained what it actually costs to operate a railroad, a further inquiry into what it should cost to operate may profitably be instituted.

This whole controversy regarding the cost of the service is as old as the railway itself. Any method of separating expenses which may be adopted will at best leave much room for honest differences of opinion and the employment of varying, arbitrary

factors. To my mind this situation resolves itself ultimately into the fundamental proposition that cost, being one of the elements to be considered in testing the reasonableness of a rate, must be ascertained as accurately as the nature of the problem will permit, otherwise it cannot be considered. How can anyone give consideration to costs unless he knows what they are? Concluding that we must arrive at costs, it devolves upon reasonable men to elaborate workable rules and methods and employ the results with a full consciousness of their limitations. After the value of the property has been established, the cost of conducting the business approximated, and the value of the service considered, there will still remain a wide zone within which to exercise "the flexible limits of judgment."

PUBLIC POLICY.

This leads me to remark briefly regarding a third fundamental factor which is influential in locating the point representing the rate within the zone of reasonableness, namely, that of public policy. The only public policy which the administrative branch of the government can officially know is the policy declared by the legislative branch through its statutory enactments. Legislatures set up the standards in accordance with which administrative bodies must measure rates; and regulative statutes generally leave ample room for the exercise of wise discretion. The public policy thus prescribed is expressed in most general terms, leaving the detailed applications to administrative action and judgment. It is not this kind of public policy which, if my impressions are correct, people have in mind when they assert that the making of railway rates has nothing to do with the cost of the service, but that it is entirely a matter of public policy. I think that generally this statement emanates from the idea that rates are to be established at any particular time solely in the light of the available surplus of the railway corporation upon which the rate is to be imposed and the judgment or feeling of the rate-maker regarding the real or supposed needs of different patrons or classes of patrons. If this is the proper basis for the making of rates the statistical analyses to which I have referred above are superfluous and should not be undertaken. All that is necessary under the operations of that kind of a public-policy-system of rate-making is a balance sheet and an eye on the next election. It is ascertained how much money the railway company can spare according to its balance sheet, and then it is a matter of "policy" who shall get the benefit of the reduction or bear the burden of an advance.

RATES IN POLITICS.

Nor is such a theory and practice of rate-making without merit. An organization of society is conceivable in which it would be the very best system. It would be a perfect fit in an ideal society constructed upon this theory. In a patriarchal organization of society it might be the only proper system, for the patriarch would be presumed to know from whom to take and to whom to give. Our present organization does not represent this type of society. An attempt to impose such a theory upon a democratic organization of society must inevitably result in throwing the entire question of railway rates into politics. It will then be largely, if not entirely, a question of clamor as to whether passengers shall ride at the expense of freight, whether wheat shall have the preference over cotton, live stock over lumber, coal over ore, vegetables over fruit, sugar over potatoes, rice over corn, etc. Obviously under such a system the available surplus will be dispersed—perhaps I should say, disbursed—in the direction of the loudest clamor and the largest vote. In a country like Prussia with its magnificent administrative traditions and machinery and far-sighted commercial and traffic statesmanship, an application of the patriarchal principle seems more readily conceivable, but even there rates are not made in just that way. While under a system of state ownership like the Prussian public policy in any proper sense of the term may exert itself more directly and more liberally, this policy is certain to meet shipwreck anywhere if it does not embrace approximations of standards with which to test that policy from the pint of view of railway operation. In other words, public policy is a framework, a background, interpretive in character, which should act as a guide in the application of more definite working rules in rate making.

DIRECTING RATE DEVELOPMENT.

There have been developed in the United States systems of rates with blankets covering two-thirds of the entire continent. Attempts have been made to break up these vast blankets, against which both common sense and reason instinctively rebel. But what is the standard toward which this breaking-up process is to be directed? Inordinately large groups have come into existence. If these are to be modified, by what measure is it to be done? The equalization theory of establishing rates for basal industries has been condemned. Along what lines are the new rates to be developed? The work of transforming these and other similarly indefensible features of rate-making of the past to which reference has just been made all point in the direction of greater consideration for distance in future rate-making. Transportation overcomes distance. Distance means expense. Shall distance have no weight in the establishment of the charge for that transportation? While no one who is at all familiar with the rates now in effect throughout the United States could for a moment reasonably consider the rigid application of a distance tariff to all traffic, it is equally apparent that many peculiarly knotty complications and controversies have already been settled through the application of a distance tariff, and that many more await a similar treatment in the future. This being so, we find herein still another urgent reason for aggressively pushing investigations into the cost of the service.

The time limits wisely imposed by the economic association upon papers of this kind permit of reference only, without discussion, to the relation of freight rates to the classification of freight. The so-called elements of classification have been enumerated and discussed in numerous decisions readily available to all. From the standpoint of cost of service, classification resolves itself largely into ascertaining transportation costs and insurance risks. Instead of emphasizing volume of the traffic, it lays stress upon the balance of the volume of traffic in opposite directions. It inquires persistently into the utilization of car space and demands upon terminal facilities and generally acts as a unifying agent along defensible lines in the slow movement towards a uniform classification.

VALUE OF THE SERVICE.

That indefinite term "value of the service" must also be separately named. "Classification" and "public policy" absorb the most of its content and "what the traffic will bear" may act as residual claimant. Those who are to follow me may attempt answers to questions relating to the value of the service, to whom? for whom? for what?

WHY A RATE YARD STICK CANNOT BE DELIVERED.

If I have succeeded in pointing out "certain considerations in railway rate-making" they are the value of the property implying a fair return thereon, the cost of the service and a sound public policy, each to be applied and interpreted in the light of the others and of all other considerations whatsoever, through the exercise of a wise discretion in arriving at a judgment with respect to a particular statement of fact. The value of the property may be expressed in dollars in advance of any rate controversy. The rate of return may conceivably be established by fixed rules. The cost of the service may be approximated for any period of time and as of any date. Public policy may be outlined in general and specific language in legislative acts without reference to particular disputes. All the other considerations in rate-making may be indexed and catalogued for handy reference. But no one can state in advance the specific facts in a rate problem or controversy and the attendant circumstances and conditions. A certain combination of facts may require the

application of a certain standard. A combination of facts similar to these but in different proportions may require a somewhat different standard. Instead of searching for one standard a set of standards may be sought, and that standard or combination of standards employed in each particular case which is best adapted to promote justice to all parties in interest. It is more important that justice shall be achieved in a large way than that some specific standard shall be promulgated and adhered to under all circumstances. That is why I cannot give you a universal rate yard-stick but must content myself with directing attention to a few of its fundamental components.

DISCUSSION BY DR. DIXON.

The paper was discussed by Frank Haigh Dixon, professor of economics at Dartmouth College, as follows:

My friend Dr. Meyer has somewhat disappointed me by going into the economic seminary room and carefully closing and bolting the door, for it seems to me that this is very much of a street-corner topic which should be discussed freely in the open and submitted to a severe pragmatic test. However, I take comfort in the fact that he has, as his paper clearly shows, carried with him into the sanctuary all his wealth of experience in practical rate making and that the "Considerations" that he has so clearly offered us are the direct outcome of this experience.

If discussion means criticism, I ought not to take the time of this meeting, for there is little if anything in the general attitude here expressed with which I cannot agree. If, after all factors are considered, there is, as the writer maintains, still room left for a "wise discretion," the fundamental principle for which the most determined opponents of the cost theory are contending is here conceded. But I do not count myself among the number of the irreconcilable enemies of the cost theory. It has always been recognized that cost is a minimum below which rates should not go; yet railways, speaking generally, have had only a most general idea of what their specific costs for specific service actually are. Moreover, the railways have deprived themselves of their right to object seriously to any attempt to investigate general costs, for frequently in rate cases they have themselves employed the cost method to justify an increase or to resist a decrease. Elaborate cost studies have been made from time to time, notably in the application now making to Congress for an increase in mail pay. Distribution of expense between passenger and freight and between state and interstate business has from time to time been made in connection with state litigation covering rates of a special class. Speaking generally, I feel that a more complete and accurate knowledge of costs than railways now possess would be beneficial both to them and to the public—beneficial to them because it would, I am convinced, reveal many instances where service is performed at a price less than the out-of-pocket expense and many other instances where specific rates long in existence, established under other conditions and for other purposes, are so greatly out of line that they should be adjusted to the prevailing standard; beneficial to the public because it would contribute just this much more aid to the solution of a problem which needs, in order to be rightly solved, every possible bit of available information.

In the new annual report form which the Interstate Commerce Commission has under consideration, there is provision for the assignment of the expenses of operation between passenger and freight service, first, of those expenses occasioned solely by either service and, second, of those expenses occasioned jointly, the latter to be apportioned according to the rule now followed by the reporting railway, the rules for effecting such apportionment to be furnished with the report. The object of asking this information is to discover whether the railways are at all in harmony in their methods of apportionment as employed in their own offices and whether from their experience rules of apportionment can be drawn and officially promulgated by the commission. Whether this proposed schedule is a reasonable requirement on the part of the commission depends, in my opinion, upon how far and into how much detail the commission eventually goes in its demand for information and the use to which it is to be put.

The parallel that Dr. Meyer draws between cost accounting in industry and cost accounting in railroading seems to me not altogether a close one. The manufacturer controls to a degree his own price, in that his price is not usually determined by an outside authority. He produces a commodity that he can store and can withdraw from the market if the price is unsatisfactory. Manufacturing industries differ widely in the elaboration of detail to which cost accounting has been carried and many have found that the assignment of overhead charges to output requires methods so arbitrary as to make the results of little value. If the problem of assigning fixed expense is almost impossible in a manufacturing industry with an output consisting of relatively few items, how much more complex the problem of the railway manager with the thousands of items of output, how much more arbitrary the rules of assignment, how remote the actual connection between cost and price. To be sure, many of the best managed railways have for years made arbitrary assignment of expenses to the various services performed, but the results have had little if anything to do with rates. They have been of value to them not because they have furnished exact information for any one year, but because being worked out in the same manner year after year, they have had a comparative value as a rough test of efficiency and it is for this purpose alone that they have been employed. To make them the basis of a rate schedule would be thoroughly unscientific, whether it resulted in an increase or a decrease in rates. If, therefore, the commission contemplates using its new information for anything more than a most general aid in rate determination, I should feel that it was proceeding in a direction that to say the least was undesirable. And if this new accounting requirement is only to throw additional light on the problem, then it seems to me the demands on the railways in the matter of additional accounting should be carefully limited. It is common, I know, for railways to use expense as their cry of wolf! wolf! whenever any new proposal is made and the expense in this case would certainly be no inconsiderable item. One road with which I am familiar is at present spending $10,000 per week in making separations of expenses for a pending state case. But, of course, the matter of expense in and of itself is no argument against it; if the people as represented by the commission want it done, it will be done, and the people will pay the bill. My point is that in this age of scientific management we should seriously consider whether the expense involved is justified or whether we are spending five whole dollars to get but thirty cents.

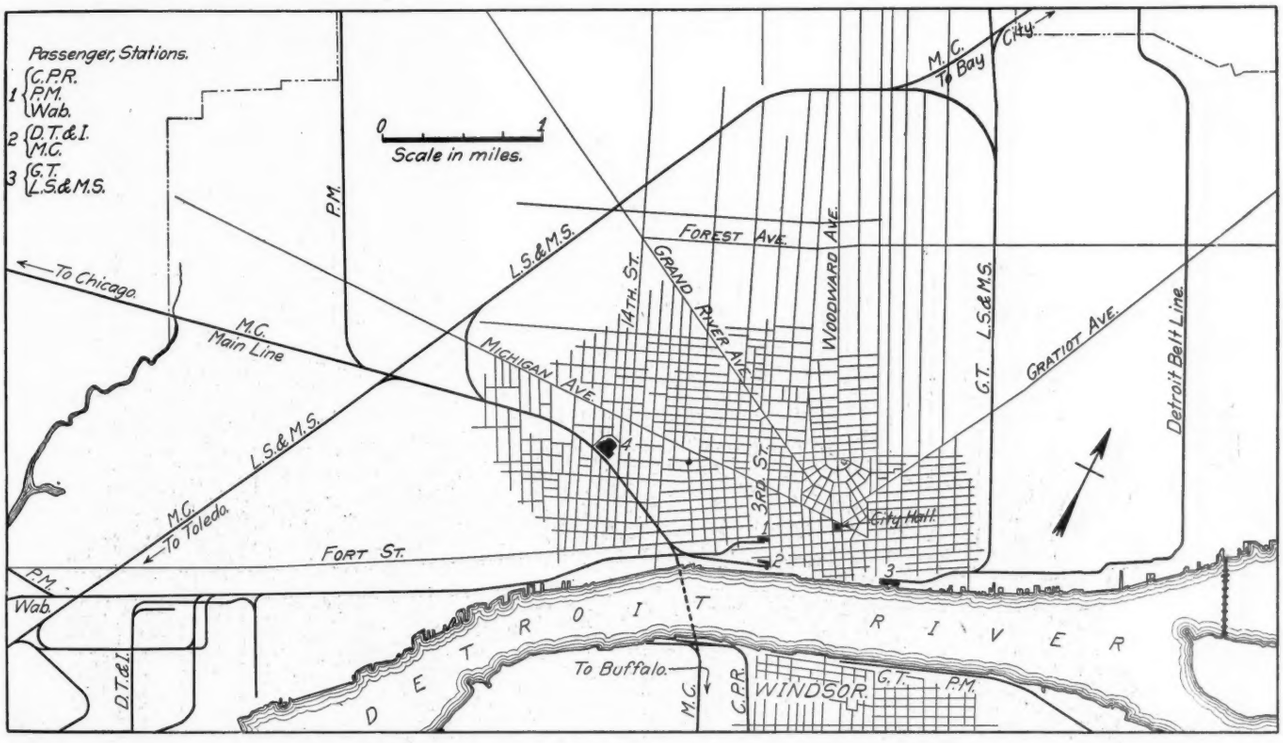
But, as I said at the beginning, I am in agreement with the general reasoning of this paper. I believe in the physical valuation movement and I believe that in determining what should be a fair return to railways we should look to capital value and not to outstanding securities. I believe that as traffic becomes denser we shall more and more steadily approach the distance principle in rate making. I welcome any information concerning cost of service that can be secured without disproportionate expense as providing assistance to the rate-maker, whether railway or governmental authority, but I welcome most of all the statement of Dr. Meyer that after every possible consideration is taken into account there will still remain "a wide zone within which to exercise 'the flexible limits of judgment.'" And this exercise of wise discretion is not a matter of guesswork or of intuition, but grows out of a long period of arduous study of the problem and is the product of a highly expert mind trained to grasp the bearings of this intricate problem. In our very able commission at Washington we have no one who better fulfills these requirements than our distinguished fellow member who has presented the paper this morning.

Michigan Central Railroad Station at Detroit

New Passenger Terminal Including a 15-Story Building Has Been Constructed at a Total Cost of $7,000,000

The Michigan Central has just completed a new passenger station and office building at Detroit, Mich., which is a part of its general plan for improving its terminals at this place and facilitating operation through the Detroit river tunnel connecting the American and Canadian shores. Descriptions of this tunnel and the earlier terminal improvements, including the new freight terminals on both sides of the river, have been published in the *Railway Age Gazette* from time to time. The new passenger terminal has been built at a cost of about $7,000,000, of which $2,500,000 was for the station and office building. The station was opened for service December 27, 1913, about one week earlier than the date planned for, on account of a fire in the old station.

In order to avoid the reverse movement necessary for through trains to reach the old station the new terminal was located on the main line about 2,600 ft. west of the tube portals. A through station layout was adopted with 11 passenger tracks under the train shed and seven additional tracks for freight carried on the same elevated structure. The approaches and all facilities in the station have been designed considerably in excess of the requirement of the Michigan Central in order to make it possible to accommodate the other roads which enter the city as tenants if the latter so desire. No announcement has been made as yet by the other roads of their intention in this respect. The Michigan Central alone handles an average of about 5,000 passengers per day in Detroit, with an estimated maximum on special days of 9,000. The old station was used by 75 trains with a total of 544 cars each day.



Plan of Portion of Detroit Showing Railway Entrance and Passenger Terminal

LOCATION OF AND APPROACHES TO THE STATION.

The station building is located on an irregular plot of land about five acres in extent between Fifteenth and Seventeenth streets and about 700 ft. south of Michigan avenue, which is one of the principal streets radiating from the center of the business district. The new site is about one and one-half miles from the center of the city and nearly the same distance from the present station on Third street. It is accessible from several street car lines and the street railway company is arranging a special line to which all passengers may transfer. A street railway loop will be constructed just east of the station, to allow passengers to be unloaded under a covered platform which is connected with the building by a covered bridge.

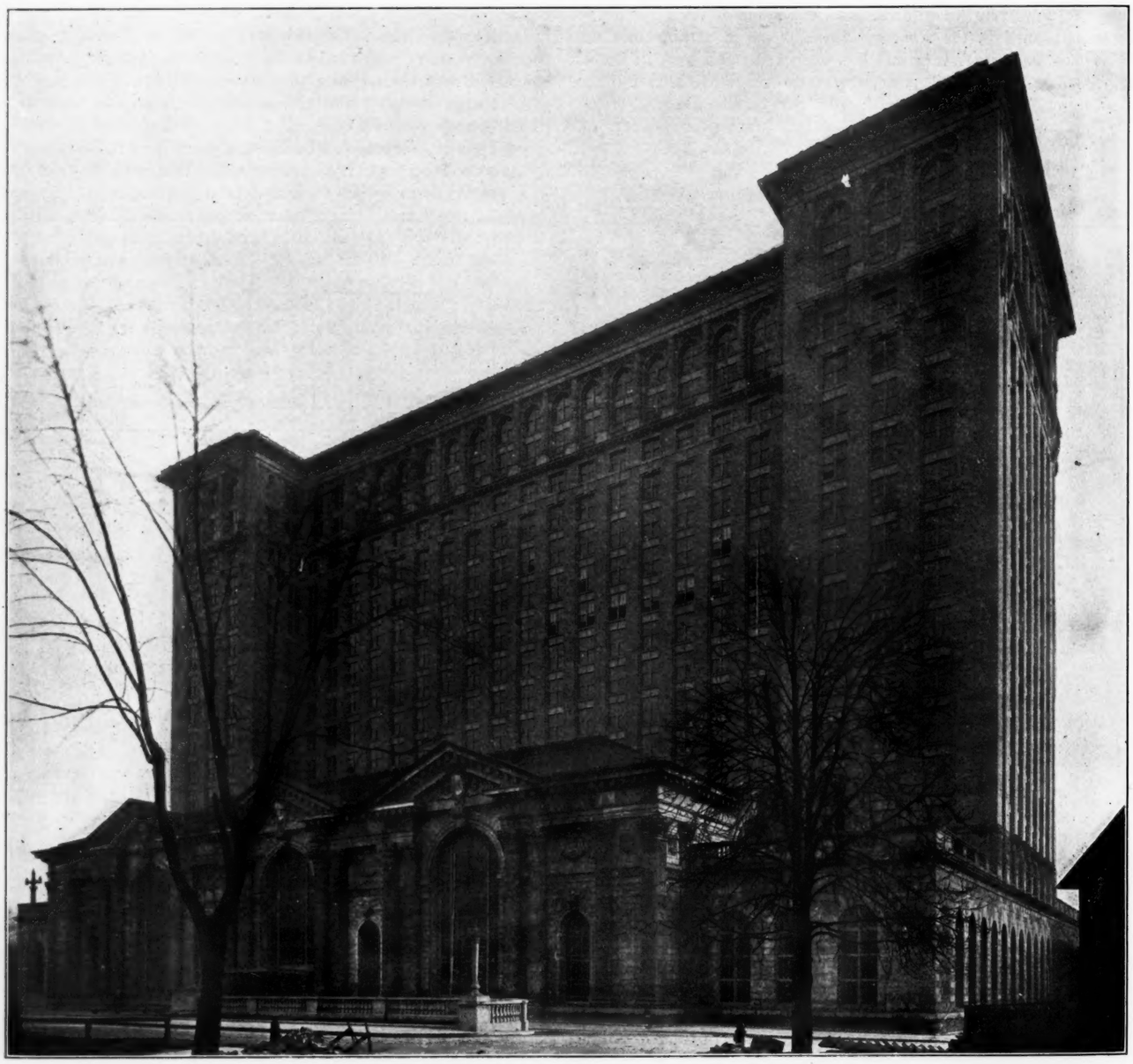
A new street has been built across the front and west side of the station to be known as the Depot Esplanade connecting Fifteenth, Sixteenth and Seventeenth streets. The front of the building is 81 ft. back from the curb line of the new street, leaving space for a driveway 20 ft. wide, curving down to the front entrance. Between this driveway and the Esplanade there is an ornamental grass plot surrounded by a granite balustrade.

On the west side of the building a 50 ft. driveway leads to a covered carriage entrance outside the concourse. This enclosure is 64 ft. wide and 86 ft. deep and is not under the cover of the main building. From the junction of the Esplanade with Seventeenth street, a street runs parallel with the west side of the building under the train shed and tracks, connecting with Newark street, which parallels the tracks south of the terminal and furnishes an outlet for express and baggage matter. Adjoining the public subway under the tracks is a private subway 40 ft. wide allowing access to the baggage and express rooms.

On the east of the building there are two private driveways, one parallel to the east end of the building and one parallel to the tracks leading down on 5 and 5.5 per cent. grades, respectively, to a wagon court serving the mail room which is

located under the tracks on that side. A public foot subway is provided under the tracks at the east end of the train shed connecting Fifteenth street with Newark street.

The street railway loop occupies the triangular piece of ground between Fifteenth street and the two inclined driveways mentioned above. A platform 17 ft. 9 in. wide extends the full length of two sides of this triangle, its inner edge being adjacent to the street car track. A steel frame shelter is provided over about 308 ft. of this platform, the rear side of which is closed by steel sash, forming a very satisfactory protection from the weather. A covered bridge 21 ft. 9 in. wide spans the inclined driveway along the east side of the building and connects the car shelter with the main station entrance on the east.



Exterior Front View of New Michigan Central Station

GENERAL CONSTRUCTION OF THE STATION BUILDING.

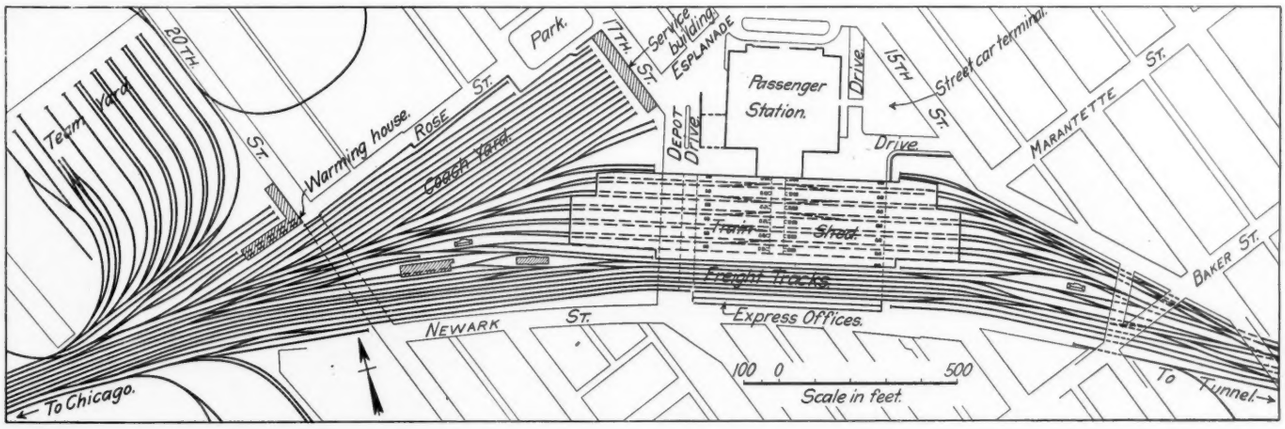
The building has a frontage of 345 ft. and a depth of 266 ft., being rectangular in shape up to the top of the waiting room roof. The office building, which extends above that elevation, is in the shape of a letter "I." The height to the top of the waiting room roof is 76 ft. and the total height of the building is 230 ft. The main building is divided structurally into three parts. The main waiting room with its auxiliary rooms at both ends, occupies a single story portion of the structure extending across the front and having a width of 98 ft. The office building portion extending up 15 stories above the station floor adjoins this on the rear. This portion of the building is 54 ft. wide in the center with wings at both ends which increase its width to 108 ft. The concourse with the facilities grouped about it occupies a single story portion of the building across the rear of the office building section. This portion of the structure is 74 ft. wide.

As the ceiling of the main station floor in the office building section is not as high as the roofs of the waiting room and concourse, 13 ft. courts are provided on both sides of the main building in order to light the floors just above the station floor of the main building.

The foundations for the building are very unusual, as the entire structure is supported on a solid reinforced concrete mat without any piers or caissons below the bottom of the mat. Rock lies at a level about 110 ft. below the surface and is overlaid with a clay which it was found during the con-

struction of the Detroit river tunnel has a tendency to run under pressure. The first plan for the foundations provided for caissons under the piers, but in view of the previous experience with this clay a more solid foundation was desired. A very exhaustive series of tests was conducted on various types of concrete piles and numerous bearing tests were made to determine the safe pressure on the clay. It was found in some cases that the material would bear 7,000 lb. per sq. ft. with only a slight deflection, but as a load of 4,000 lb. per sq. ft. caused no settling, it was decided to adopt the latter

The building is a steel framed structure with concrete and terra cotta protection for the metal. Terra cotta partitions are used throughout. The walls up to the window-sills on the main floor, conforming to the grades, are of granite. Bedford Dark Hollow blue limestone is used up to the sills of the first office door, including the waiting room in front, which is partly enclosed by the end walls of the main building. Above this first office floor a light colored pressed brick which harmonizes with the limestone is used up to the twelfth floor. Above the brick is terra cotta ornamented with



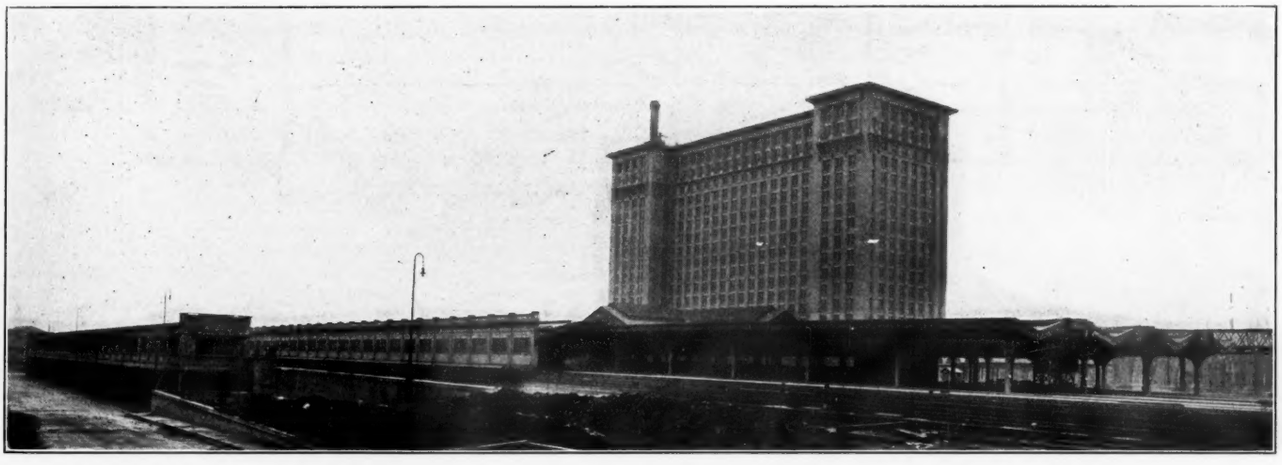
General Plan of New Passenger Terminal at Detroit

figure in the final design. The solid concrete mat covering the entire area under the building was designed to avoid all settlement and up to the present time very careful measurements show that this has been realized. If any settlement should occur, the mat would insure a uniform movement of the entire structure.

The bottom of the mat was located at elevation 92, which is 24.75 ft. below the waiting room floor. A uniform thickness of 42 in. was used for the mat under the office building portion and 30 in. under the waiting room and concourse, the bottom of the entire mat being kept at the same elevation. The column loads were distributed over an area sufficient to keep the resulting pressure within the adopted maximum, the height and spread of each footing being designed for the load to be carried. In order to tie these footings to the mat, dowels up to five ft. in length were used, as many as 100 being placed in one footing in some cases. The excavation for the foundation was made by the railway company with steam shovels and the mat and footings were placed with six mixer outfits.

columns and festooned spandrels. At each corner a balcony is arranged with columns bracketed out, breaking the straight lines and lighting up the entire facade.

The main entrance on the north is covered by a massive marquise. Above the entrance and to each side of it are three large arched windows 21 ft. wide and 40 ft. high, with small ones 8 ft. by 20 ft. between the large ones. The piers between these windows are ornamented by fluted Corinthian columns surmounted by a richly carved entablature. This front is of limestone, with four-cut granite following the grade around the building for 3 ft. above the ground. This granite base is surmounted by a molded course, upon which the column bases are set.



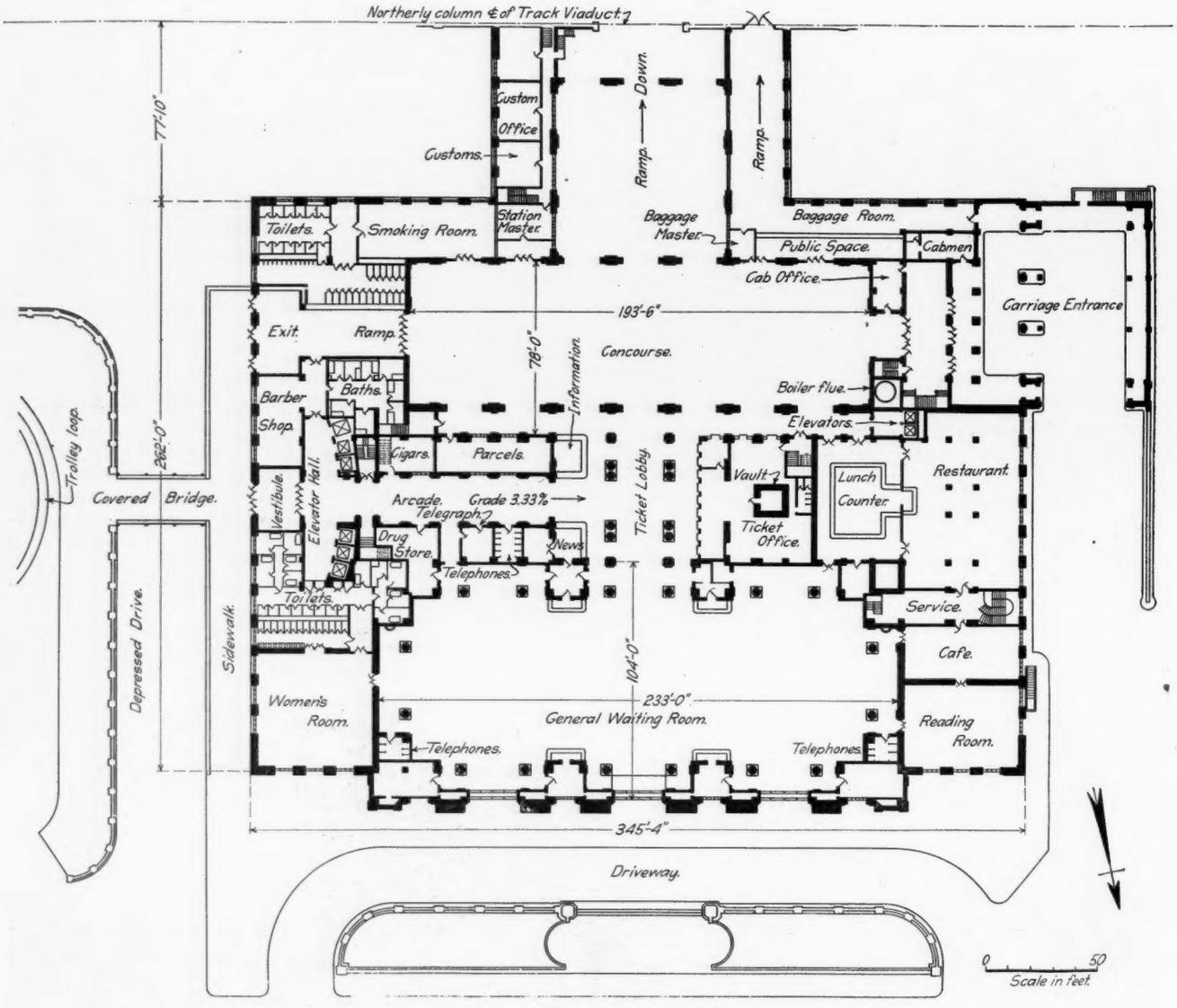
Rear View of Michigan Central Station, Showing Express Building at Left and Train Shed

The building contains 7,000 tons of structural steel, with 3,500 tons additional for the train shed and about 9,000 tons for the viaduct carrying the tracks. About 125,000 cu. ft. of stone, 1,500,000 face brick and 7,000,000 common brick were required in the structure. The foundation mat and side walls required 20,000 yds. of concrete and 500 tons of reinforc-

ing steel. The station proper includes about 11,000,000 cu. ft. of space.

STATION FACILITIES.

All the facilities for handling passenger business are located on the first or street level floor. As explained above, there are three main entrances to the station for passengers, but the building has been designed with the expectation that at least 75 per cent. of the people will come on street cars and will use the east entrance from the street car loop. Entering the building from this side the passenger finds himself in an elevator hall from which an arcade leads directly to the ticket lobby located in the center of the building. This lobby opens into the main waiting room to the right and the concourse to the left.



Street Level Floor Plan of Detroit Passenger Station

The bank of elevators just inside the entrance contains five passenger and one freight elevators serving the office floors above. Full-height stairways are located directly back of the elevators, the staircases being fireproof and entirely enclosed. On the south of the elevator hall is the barber shop, which also has an entrance from the concourse. This shop is finished in white marble and is connected with a series of eight bath and dressing rooms which are finished in marble, white enameled tile and white oak with terrazzo floors. These rooms are designed to allow out-of-town patrons to change clothes and dress for evening appointments without going to a hotel.

Just west of the elevator hall in the arcade are located the drug store, telephone and telegraph booths and the news-stand on the north side, and a cigar store, parcel room and information bureau on the south side. The rooms on the north side of the arcade also have entrances from the waiting room and those on the south have connections with the concourse. The news-stand and information bureau, which are located at the intersection of the arcade and ticket lobby, can also be approached from the latter. As there is a difference in elevation of about 2¼ ft. between the east entrance and the ticket lobby, the floor in the arcade is inclined.

The ticket lobby extends from the center of the waiting room directly opposite the front entrance south to the concourse. This lobby has a marble floor, marble wainscot, and Caen stone walls and ceiling. There are two rows of marble columns down the center of this lobby, dividing the line of travel and separating patrons of the ticket office from those having business at the news-stand and information bureau.

The ticket office has a total frontage of nearly 130 ft., with 19 ticket windows. The front of this office is finished in marble and imitation Caen stone with bronze grillages and

marble deal plates. In the center above the windows is an ornamental bronze clock with marble face in plain view from the east entrance.

The main waiting room, occupying the front of the building, can be reached from the ticket lobby as mentioned above, or directly through the main entrance from the drive in front of the building. The room is 234 ft. long and 98 ft. wide with a broad vestibuled entrance in the center. At the ends of the room large piers are set in 12 ft., between which spring flat domes. On a line with the inner face of these piers is a colonnade of Doric marble columns 21 ft. high, extending entirely around the room. The floor is of marble tiles, and the wainscot and columns of Kasota marble. The walls above the wainscoting are of imitation Caen stone and the ceiling is made up of Gustavino arches lighter in color to match the Caen stone. The woodwork in this room, as in all the large

Interior View of Bush Train Shed Showing Overhead Third Rail

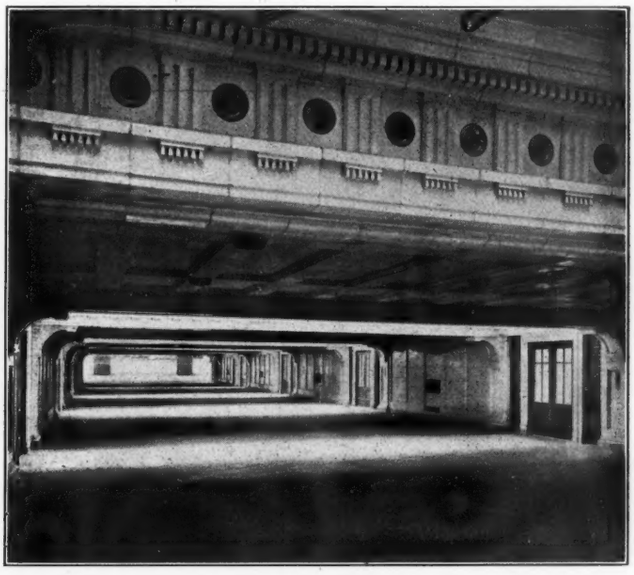
public rooms, is of Indian mahogany, the seats being of the same material with marble risers.

At the east end of the main waiting room is the women's waiting room, 52 ft. x 52 ft., entered through the colonnade between the piers mentioned above. The woodwork in this room, including the wainscot and panels in the ceiling, is of quartered oak finished in flake white. The women's free and pay toilets adjoin this room and in connection with them a series of bath and dressing rooms are provided which serve the same purpose for women patrons as those for men described above in connection with the barber shop.

At the west end of the main waiting room, reached through a similar entrance, is a men's reading room 39 ft. x 52 ft., which is an innovation in this station. This room is fitted up with the same luxurious furnishings found in first class hotels and will be supplied with an abundance of good reading matter. It is expected that this feature will appeal strongly to men who desire to retire from the bustle and confusion of the general waiting room, and who do not wish to smoke.

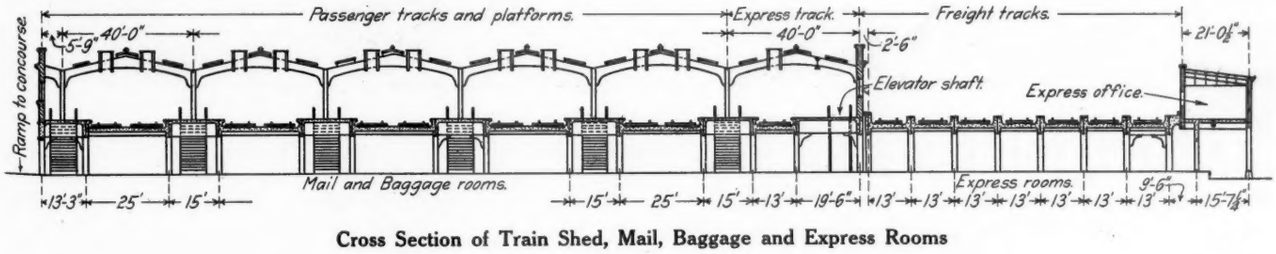
A restaurant, lunch room and cafe are located just west of the ticket office and south of the reading room. The lunch room can be reached either from the main waiting room or from the concourse. It occupies a part of the same large room with the restaurant, the lunch room being 39 ft. x 52 ft., and the restaurant 52 ft. x 78 ft. This room is finished with a Welsh quarry tile floor, marble wainscoting, Caen stone walls and domed ceiling of the same material. A small service room connecting with the kitchen below adjoins the restaurant on the north and adjacent to this service room is the cafe 26 ft. x 52 ft., which can be reached either from the reading room or the main waiting room.

The concourse extends east and west across the entire building and is 78 ft. wide and 204 ft. long. At the west end is



Subway Under Tracks

the cab and carriage entrance connecting with the covered carriage enclosure described above. Passengers coming by carriage to this entrance can purchase tickets at the windows facing on the concourse and can check baggage just inside the entrance. At the east end of the concourse is the main exit opening out on a covered balcony which connects with the street car shelter by the bridge described above. It is expected that most of the passengers leaving the station will use this exit passing directly from the train shed subway down the concourse and out of the building without conflicting with passengers going to their trains,



Cross Section of Train Shed, Mail, Baggage and Express Rooms

the majority of whom will come from the ticket lobby. On the south side of the concourse near the east end is a smoking room, 25 ft. wide and 60 ft. long, with seats running around the outside walls.

The walls of the concourse are of light colored brick laid in Flemish bond with panels outlined with terra cotta strips. The pilaster caps and bases are of terra cotta and the molded members of the cornice beams and ceiling panels are of copper with

large skylights in the center which serve to diffuse the light through the whole area.

Opening from the south side of the concourse directly in line with the front entrance and ticket lobby, through three large openings with a total width of 76 ft. is the inclined passageway leading under the train shed. On account of the difference in level between the street and the tracks, it was necessary to use a grade of about 7 per cent. on this ramp. The subway under the station tracks is 40 ft. wide and 8 ft. high. The use of ramps to connect different levels is typical of the design of the entire station. There are no steps to be climbed by passengers except those from the subway to the station platforms, which could not be avoided. Along the east side of the ramp are located the quarters of the customs officers and directly below are the immigration bureau and the detention rooms.

As the passenger tracks are arranged in pairs on 12 ft. centers with 28 ft. between adjoining pairs, 19 ft. platforms are used in the center of which stairways from the subway below are brought up. Train indicators are located on both sides of the doors leading from the subway to the stairways. Passengers can be held at these doors until trains are ready.

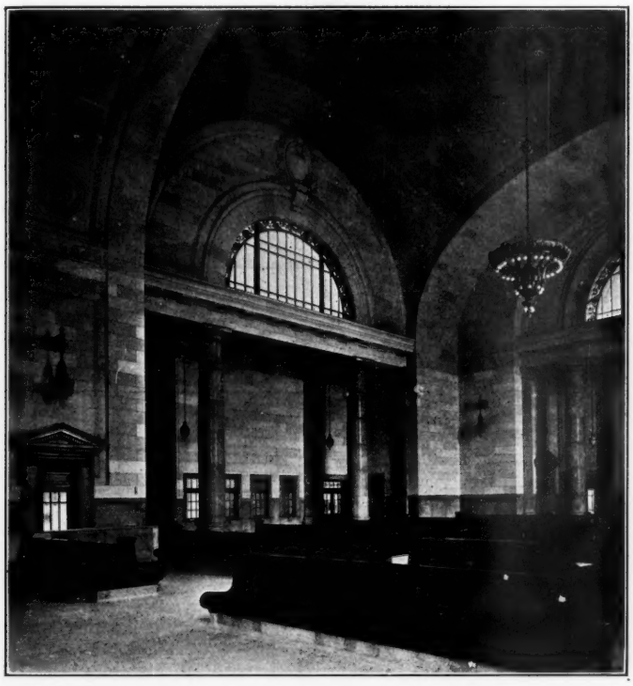
Looking East in the Main Waiting Room

TRAIN SHED AND STATION TRACKS.

The train shed is of the Bush type, 250 ft. wide and with an extreme length of 1,104 ft. It covers 11 tracks and is enclosed on the north and south sides. Some of the passenger platforms extend beyond the end of the shed, having an extreme length of 1,400 ft. The roof is supported by structural steel columns 40 ft. apart, a clearance of 15 ft. 6 in. being provided under the smoke duct above the top of the rail. The roof girders support a 2½ in. concrete slab which is made up of a sheet of Hyrib with 2 in. of concrete above it and ½ in. below. This slab is waterproofed and covered with a smooth roofing. About 28 per cent. of the area of the roof, exclusive of the open ducts, is covered by Drouvé Anti-Pluvius puttyless skylights, those at the apex of the roof being 3 ft. wide and those over the platforms 5 ft. wide. The skylights have been set up above the level of the roof higher than is customary in order to avoid any danger of water backing up and flooding through the openings during severe storms. Copper flashing has been used liberally around the skylight openings to make this precaution still more effective. In draining this roof, large down spouts are used and every precaution has been taken to prevent freezing and clogging of these pipes, including steam jets at the elbows of the drains to keep them free of ice in severely cold weather. Two longitudinal and 13 transverse expansion joints are provided in the design of the train shed roof.

As the tunnel is operated by electricity and all tracks adjacent to the station are equipped with third rails for the operation of electric locomotives it was necessary to make such a provision on the tracks in the train shed. As trains coming from and leaving for the west are pulled into and out of the station, respectively, by steam locomotives, it was also necessary to provide a shed which would care for the smoke from these engines. It was first planned to use third rails for the electric operation of the station tracks, placing these rails in the middle of the running tracks, but it was later decided that it would be desirable to have the power rail overhead and such a system has accordingly been installed. A 30-lb. rail with standard third rail insulators is suspended from wooden blocks bolted to the roof girders and supported at intervals of about 10 ft. between the girders by wood strain insulators. This rail is inclined upward

at each end for a length of about seven ft. to receive the shoe without shock. In order to make the problem of supporting these rails from the roof construction somewhat simpler and also to avoid interference with steam locomotives, the rails were located 3 ft. from the center line of the track and special contact shoes were located on the electric locomotives in a corresponding position.



One Corner of the Main Waiting Room

As it is necessary to break up many of the through passenger trains at Detroit, two crossovers are provided between each pair of tracks to facilitate handling such movements. In order to care for the smoke from steam locomotives using these crossovers, it was necessary to provide some opening in the roof above these tracks. It was decided to use Transite asbestos smoke jacks of standard size which are placed with their lower ends adjoining in order to provide as nearly as possible a continuous outlet for the smoke.

View of Upper End of Ramp

Just inside the south wall of the train shed there is a 20-ft. platform served by a single track used for express business

View of Main Concourse

alone. This platform is served by six elevators. South of the seven freight tracks on the viaduct is located an express office 20 ft. wide and 533 ft. long, with the space divided among the express companies doing business at the station.

BAGGAGE, EXPRESS AND MAIL ROOMS.

The baggage, express and mail rooms are located below the viaduct. The mail room is on the east, approached from the two drives from Fifteenth street, north of the tracks, and the baggage room is on the west, served by the driveway on that side of the station building. On the south are the express rooms, 530 ft. long and 103 ft. deep, facing Newark street, which allows ample access for trucks. The steel viaduct structure which carries the tracks over these rooms has a concrete deck on which is laid 4 in. of asphalt mastic to deaden the noise of trains passing overhead and to eliminate the vibration as far as possible.

The baggage is trucked to and from the checking counter in the concourse to the baggage rooms under the tracks over a ramp adjacent to the passenger ramp. It is handled to and from trains by trucks which use the elevators in the passenger platforms. One of these elevators is provided near the end of each platform so as to eliminate most of the trucking along the platforms with its resulting interference with the passengers. Elwell-Parker electric storage battery trucks are used throughout as the distances are so great that hand trucking would be very expensive.

In general, mail is also handled by trucks between the mail room and the cars, but in certain cases when mail is brought in in carload lots, it is dropped into two special mail chutes in the north platform which are directly over the mail room. Small lots of express are handled to regular trains in the same manner as the baggage and mail. Carload lots of express are made up from the special express platform along the south side of the shed. At the east end of the train shed there is a depressed track for loading wagon loads of mail and also a loading platform for automobiles sent by express.

OFFICE BUILDING.

The office building rising over the center of the station is 345 ft. long and 232 ft. high. The central portion is 54 ft. wide with a wing at each end 108 ft. wide. The first floor above the ground level is a mezzanine over the rooms on the east and south sides. On this floor are located a number of offices, including the paymaster's and the telegraph and telephone and train despatching rooms. The next floor above is used as a storeroom. At the west end of this floor over the dining room is an employees' dining room and lunch counter. The floor above this is used as a pipe loft where all piping for the building is brought for distribution.

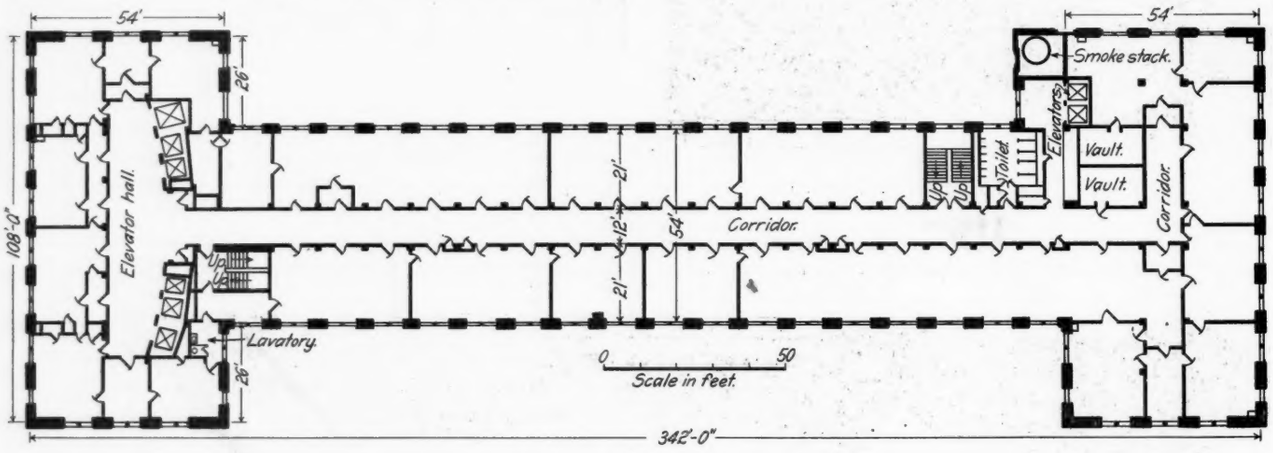
There are 13 office floors above those mentioned, each having an area of about 18,000 sq. ft. The spacing between floors is 12 ft. 6 in. These floors are all arranged with a 12 ft. corridor running through the center from east to west, this corridor having a terrazzo floor, cove base and marble wainscoting 7 ft. 6 in. high. The woodwork throughout the office building is of oak. A series of glass transoms in the office doors provides very good lighting in the corridors. At the east end of the corridor are the electric elevators and just back of the elevators are the stairways. At the west end there is another stairway extending the full height of the building and two more elevators. The upper five floors are not being finished at present but it is expected that the future expansion of the offices of the Michigan Central, which have been badly congested and somewhat scattered over the city will in a short time require this additional space.

MECHANICAL EQUIPMENT.

The power house for the station and office building is located on the basement floor. In addition to the power house this floor contains a large and well appointed kitchen under the dining room, and the immigrants' rooms for men and women under the customs offices and smoking room.

The boiler room is located in the west end of the basement under the cab shelter and outside the walls of the main building. The boiler equipment consists of five 450-h. p. water tube boilers installed by the Toledo Flanner Water Tube Boiler Company. The coal for this plant is delivered to a track hopper located in the coach yard across the street west of the station. From this hopper the coal passes through a crusher located below the surface of the ground and drops onto a belt conveyor running in a concrete tunnel under the street, the tunnel being about 270 ft. long and having a minimum cross section of 12 ft. by 12 ft. The conveyor carries the coal into the boiler room and up to a traveling bucket elevator which delivers it to the automatic stokers. The ashes from the boilers are dropped down into small push cars which are run through the tunnel on a narrow gage track and hoisted in the coach yard alongside the coal hopper. The draft for the boilers is secured by a steel stack extending up through the walls of the building and about 30 ft. above the top of the office portion.

The building is steam heated, a complete thermostatic control being installed. In addition to the steam for heating, the boilers supply four steam pumps, two for fire and two for service. The water supply, both for service and fire purposes, is normally drawn from storage tanks located just under the roof of the office building. A storage capacity of 20,000 gal. for fire and 10,000 gal. for service is provided. The fire protection in the building includes two hose reels on each office floor and hydrants at convenient points about the building. All water used



Typical Office Floor Plan

in the station and office building runs through a mechanical filter located in the basement. In addition to being filtered, the drinking water is brine cooled by a circulating system and is piped to sanitary drinking fountains in all the public rooms of the station and also to all offices.

A steam driven vacuum pump is installed in the power house to operate the vacuum cleaning system used throughout the station and office building. There are five connections in every corridor on the office floors and it is estimated that with this installation one man will be able to clean 3,000 sq. ft. of floor area per hour. The forced draft in the station and in the toilet rooms on the office floors is secured from eight Sirocco blowers in the machine rooms. A suction fan located in the pent-house on the roof of the office building is used to ventilate the kitchen.

The electric power is 4,600 volt 3-phase alternating current. In order to eliminate as nearly as possible the chance of a failure of the supply, three independent main feed cables were installed. Two of these are run direct from Commonwealth Edison generating plants and are brought in from opposite sides of the building through the retaining walls and foundations. The third line is run from a commercial sub-station not far from the new terminal. The power entering the building first passes through hand controlled oil switches, then through transformers and then to the main switchboard or the motor generators.

Direct lighting is used throughout the terminal with the single exception of the barber shop, where indirect fixtures have been installed. The large fixtures in the main waiting room are massive but have been carefully designed to avoid a heavy appearance and to insure their harmonizing with the other features of the room.

In wiring the offices, removable baseboards were installed behind which all wires are run, allowing connections and changes to be made readily. Numerous wall plugs are provided for running fans and other small electric equipment, and on three floors, which will be used by the auditing department, special dictograph plugs have been installed under the desks. An intercommunicating telephone system with 225 instruments covering the entire station, office building and yards was installed by the Automatic Electric Company, Chicago.

A complete clock system is controlled from a master clock in the office of the station master, these clocks being located in all the public rooms of the station and wiring being carried through the office building to allow their installation at any desired point. An automatic announcing board has been installed in the concourse which is also controlled from the station master's office and a telautograph with five or six connections at various points in the building will be used to announce the approach of incoming trains.

OTHER BUILDINGS AND FACILITIES.

Northwest of the train shed is located the coach yard with facilities for testing, repairing and cleaning coaches. In this yard is located a warming house, 200 ft. long, covering two tracks, in which four cars can be heated simultaneously, the temperature attained being sufficient to thaw out pipes in dining and Pullman cars very rapidly. A wheel pit has also been installed in this coach yard in which a wheel can be removed and a new one put on in 11 minutes. The yard has a capacity of about 175 cars. At the end of this yard and just across the street from the station is a service building in which are located quarters for the Pullman company, the commissary department, car cleaners, yard foremen, air brake testing rooms, etc. This building is two stories high with a basement and is of fireproof construction throughout. At the end of this yard, enclosed by a retaining wall at Seventeenth street, is a team track for receiving supplies used in the terminal. At the east end of the station just north of the train shed are two private car tracks with an enclosed private driveway from Fifteenth street, by which a carriage may reach this track and passengers may board cars without going through the station. In this manner it will be possible to furnish the desired seclusion from the crowds.

About 300 ft. west of the south wall of the train shed is a house for the accommodation of revenue inspectors of freight and just west of this is an inspection shed and repair shop for electric locomotives. Two interlocking plants control the station layout in connection with the protection system through the tunnel. The electric interlocking plants were installed by the General Railway Signal Company, a 176-lever frame being installed in each tower. The track circuits are alternating current, a single rail being used for the signaling circuit. The switch and signal operating mechanisms are designed for direct current. Dwarf semaphores are used throughout the terminal. The power for operating the signal system is secured from transformer rooms in the basement of the towers, an auxiliary emergency system being provided by a connection with the steam power plant.

PERSONNEL AND CONTRACTORS.

The project for building this new passenger terminal was begun in 1908 and the property was acquired by 1910. The work was begun in April, 1912. H. B. Ledyard, vice-president of the Detroit River Tunnel Company, was given full authority to plan and erect the new terminal. The design of the station and office building was made by Reed & Stem and Warren & Wetmore, architects for the Grand Central terminal, New York, under the supervision of George H. Webb, chief engineer of the Michigan Central Railroad and the Detroit River Tunnel Company. The train shed was designed and the entire construction work carried on under the direction of the chief engineer, assisted by the company's architect, E. W. Smith, and bridge engineer, H. Ibsen. The structural engineer in direct charge of the inspection of the building was W. B. Goddard, Jr., who was assisted by F. A. Pruitt. The signaling, interlocking, and track electrification was under the charge of J. C. Mock, signal engineer, assisted by G. C. Winslow, assistant engineer. The contractor for the station and office building was the George A. Fuller Company, Chicago. The steel for the building was rolled by the Jones & Laughlin Company and fabricated by McClintock, Marshall & Company. The stone work was furnished by the Consolidated Stone Company, Bedford, Ind. The reinforced concrete floors were built by Stanley Gollick, New York; the electric wiring was installed by the Sanborn Electric Company, Indianapolis, Ind.; the hardware by Yale & Towne, New York; the train shed skylights by the G. Drouvé Company, Bridgeport, Conn.; the roof by the Johns-Manville Company, Chicago; the steel sash by the Trussed Concrete Steel Company, and the Detroit Steel Products Co., Detroit, and the elevators by the Otis Elevator Company, Chicago. We are indebted alike to engineers, architects and contractors for the above information.

RAILROAD CONSTRUCTION IN THE RUSSIAN RIVIERA.—The Russian Riviera is that portion of Russia on the east shore of the Black sea and forming a part of that region between the Black sea and the Caspian sea. It is perhaps best known as an oil-producing center. Up to the present time, however, the only towns on this coast to which there is railway communication are Batoum, Poti, Terapse and Novorossisk, and there has been no direct connection between these towns and the Crimea. At the present time there is under construction by the government such a link. A line is being built from Poti to Terapse, and that will be continued northward to Novorossisk. Eventually a direct route will be available from Warsaw through the Crimea to these towns. Terapse has recently sprung into importance owing to the nearby oil fields. Extensive harbor improvements are now in contemplation, and a second oil pipe line will shortly be completed. The new railroad will run along the seashore and will gain its importance chiefly because it will form a second means of communication with India, shorter by 372 miles than the proposed Constantinople-Baghdad line.

Summary of Interstate Commerce Commission Questions

A Complete Summary of the Information Required From the Railroads in the Rate Hearing Case

The Interstate Commerce Commission has just sent out under date of December 20, with amendments dated January 5, a set of questions, together with the blank forms on which these questions are to be answered, to all of the railroads involved in the application of trunk line and central freight traffic association territory roads for an increase of 5 per cent. in freight rates. The questions themselves, which were made public a few days ago, consist largely of simple directions to fill out certain forms. The summary given herewith, therefore, includes not only the question itself, but a general summary of the headings on the forms so that some estimate may be made of the scope and nature of the Interstate Commerce Commission's inquiry.

The information required deals with seven classes of questions—those relating to preliminary information; information as to revenues and the conservation thereof; information as to economy; information as to financial history and present standing; information as to the other interests of directors, officers and employees; information as to sleeping car operations; and general information.

Questions 1, 2, 3, 4 and 5 deal with the preliminary information and are: The name of the corporation; date of organization; address of the officers dealing with the report; names and addresses of the executive committee, of each of the directors and of each of the members of a voting trust, if there is any; and the names and addresses of certain officers, including president, vice-presidents, secretary, treasurer, counsel, general manager, chief engineer, superintendent of motive power, mechanical officers down to and including master mechanics, purchasing agents, storekeepers, fuel and tie agents.

Questions 6, 7, 8 and 9 deal with the revenues and conservation thereof. Question 6 requires the companies to fill out eight forms showing joint traffic moving under through or proportional rates for domestic use; local traffic moving under local rates for domestic use; and the same for joint traffic for export and local traffic for export for the month of October, 1913; for corn, oats, wheat, flour, hay, feed, cattle, sheep, hogs, dressed meat in refrigerator cars, dried meats, etc.; packing-house products, bituminous coal, coke, iron ore sold, oak lumber, spruce lumber, pine lumber, hemlock lumber, wood pulp, petroleum products in barrels, sugar, pig iron, steel rails, iron or steel billets, copper bullion, bars, etc.; manufactured iron and steel articles, including structural iron and steel, cement and agricultural implements. For each one of these classes of traffic the following information is required: Point of origin; final destination; waybilled from and to; route; weight of shipment; railroad and I. C. C. tariff references; class rate; commodity rate or combination rate; joint through or proportional rate per ton or pound; arbitraries deducted before prorating, and the railroad and basis for each arbitrary; the respondent's proportion of the total rate; respondent's gross freight revenue; tariff allowances and deductions chargeable to respondent's freight revenue; respondent's net freight revenue; actual distance carried by the respondent; number of carloads; loaded car miles; tons carried one mile; minimum weight of rating to car prescribed by tariff; average load per car; respondent's net freight revenue per ton per mile, in five decimals; kind or class of cars required and furnished; whether or not traffic is competitive; an analysis of tariff allowances and deductions chargeable to respondent's freight revenue, including switching absorbed, elevation, lighterage, drayage, and any other items which the respondent may wish to enter. In connection with this the railroad is required to show approximately the percentage of empty car movement on the line of the respondent resulting from the transportation of each commodity from each point of origin to each point of destination, based on the ratio of the loaded car mileage to the empty car mileage; from point of destination or delivery to connecting line to point of reloading or delivery of empty car to junction point of connecting line; and further the railroad is required to state whether any of the commodities are given expedite service in fast trains or special trains, and if so, to describe in detail the kind of expedite service from each point of origin to each point of destination and the reasons therefor.

Under question 6 also the railroad, on forms 5, 6, 7 and 8, is to show for each one of the commodities previously mentioned the through or proportional rates for domestic and the local rates for domestic, and the same for export freight in the following detail: Number of carloads; minimum weight of lading per car prescribed by the tariff; loaded car miles; number of net tons; average load per car; tons carried one mile; average haul; respondent's gross freight revenue; tariff allowances and deductions chargeable to respondent's freight revenue; respondent's net freight revenue; net revenue per car mile; net revenue per ton per mile, in five decimals; kind of equipment required and furnished; description of special fittings to equipment required and furnished; charges against shippers for special fittings furnished; whether or not reconsignments are allowed; terms and extent of reconsignments; whether or not mixing of other freight is permitted; and an analysis of the tariff allowances and deductions chargeable to respondent's freight revenue for switching absorbed, elevation, lighterage, drayage, etc.

Question 7 requires the railroad company to show each class of payment made by the respondent during the year ended June 30, 1913, for service in connection with the transportation of freight where such payments are absorbed, that is, deducted from revenue and no charge made to the shipper by the respondent showing the point where the service was performed; the name of the agency by which the service was performed; the financial interest, if any, of the respondent in this agency; the nature of the service, and the amount of the absorption.

Question 8 is as follows: To what extent, if any, have passenger rates charged by the respondent been reduced since July 1, 1903, in compliance with state laws? What has been the effect of such reduction upon the passenger revenue of the respondent? State fully the methods employed in arriving at the amounts given.

Question 9 requires the railroad to furnish the following information for services performed by the respondent during October, 1913, in spotting cars for loading or unloading on private tracks. The location of the track; the class of service; the industry served; the number of cars spotted; the charge, if any; approximate length of the movement one way. By private track is to be understood any side track or spur track owned, leased or otherwise controlled by a shipper or shippers.

Economy.—Question 10 requires the railroad to give the following information regarding all equipment purchased or put in service between July 1, 1898, and June 30, 1913: For locomotives—class; type; number; date placed in service; builders; date of contract; contract price; cost of appliances furnished by carriers; rebates received on appliances furnished by carrier; total cost to carrier; tractive power; weight of engine and tender; and basis of payment, showing amount of cash and trust obligations, with a description of same. For passenger, freight and work train cars similar information is required, except that in place of class and type, the M. C. B. designation, length over all, and seating capacity or tonnage capacity are required; and instead of tractive power, the lighting and heating

system is called for for passenger cars. With this information must be submitted copies of contract; list of appliances and statement of conditions under which appliances are furnished; lists showing names and business addresses of the firms supplying appliances, and the names and business addresses of all firms and individuals with whom negotiations incident to the letting of contracts or the supplying of appliances were conducted. Provision is made for showing this information in regard to equipment covered by equipment trust certificates and equipment built by the company. In the latter case elaborate figures for cost are required.

Question 11 calls for copies of contracts covering the purchase of materials, including treatment of ties and sale of scrap during the fiscal years ended June 30, 1910, and June 30, 1913; question 12, specifications for material bought during these two years; and question 13, a description of methods of inspection and testing material purchased under such specifications.

Questions 14 to 19, inclusive, require a description of any testing laboratories that the company may have; a description of the duties of the testing engineer, if one is employed; a description of the methods of co-operation with other railroads in conducting tests or inspecting materials; a full statement of what disposal is made of material rejected by inspectors; a description of the method in use for collecting, sorting and disposing of scrap, and of what measures are taken to reclaim and put in service the usable material that finds its way into scrap; and a description of the methods used in purchasing, storing and distributing material used for maintenance and for operation.

Question 20 requires the railroad company to furnish a copy of the guarantee, if any, in effect in 1910, 1911, 1912 and 1913, in regard to mileage performance of lubricating oil or compounds, and to show for each of these years an invoice cost of lubricants used in service covered by the guarantee, with the kind and quality of each, and the invoice price and invoice cost; the cost of lubrication based on guarantee in miles run, guaranteed rate and guaranteed cost; the excess of invoice cost over guaranteed cost; the excess refunded to the respondent, with the bill, number and amount.

Question 21 calls for a copy of the guarantee in effect during each of the years 1910, 1911, 1912 and 1913 in regard to mileage performance or length of service of cast iron wheels, and to show the number, unit, weight and capacity of cars to which applied of all wheels applied subject to guarantee; the date applied; the date removed; number, unit, weight and capacity of cars from which removed of all wheels removed that had not fulfilled the guarantee; and the same for all wheels removed that had fulfilled the guarantee; and the total number, total weight, and names and addresses of purchasers of scrapped wheels sold.

In addition, the roads are required to show the following information in regard to accidents caused by wheel failures from July 1, 1909, to June 30, 1913; the date of accident; location; kind of train; cause of accident; the kind, weight, date cast, date applied of wheel causing the wreck; where purchased, or a replacement, and the capacity of the car and cost of clearing wreck; cost of repairing roadbed; cost of repairs to equipment; payments account of loss and damage to freight or baggage, and payments account of injuries to persons.

Questions 22, 23 and 24 call for a statement as to whether or not tie specifications are based on exact data ascertained by tests, and if tests have been made between July 1, 1910, and June 30, 1913, to ascertain the sizes and kinds of ties, treated or untreated, best adapted for use in the respondent's territory. Full details of these tests are to be given and a list of the producing territories where the railroad obtains its supply of ties.

Question 25 asks for the following information in regard to ties bought in 1910, 1911, 1912 and 1913: The kind and number of each kind of tie purchased and the unit price of each kind, and this information is to be divided as between ties used on track maintenance and those used on construction, or additions and betterments, with separate returns for treated and untreated ties.

Question 26 asks for available data in regard to average life of each of the several kinds of ties removed from track since July 1, 1910.

Questions 27 and 28 call for the following information in regard to the consumption and cost of fuel in the fiscal years ended June 30, 1910, and June 30, 1913: The tons of coal divided as between anthracite and bituminous; the tons of coke; the total fuel consumed, and the miles run, and the average number of pounds consumed per mile for freight locomotives, passenger locomotives, mixed, special, switching and non-revenue. For bituminous coal, anthracite coal and coke, the purchase price, total and per ton; the freight charges paid by other carriers; the cost of handling at coaling stations; other expenses, such as the preparing sizes, testing and storing and cost of fuel placed on locomotives.

Question 29 asks a description of each type of coaling station in use in 1910 and in 1913, and the average cost of handling coal through each type in these two years.

Question 30 asks for figures, if available, showing the consumption of fuel by individual locomotives by class of service; by individual enginemen, or otherwise, for the months of January and August, 1910, and January and August, 1913.

Question 31 asks for the results of all tests since June 30, 1910, of the performance of specific locomotives made under expert instruction for comparison as to consumption of coal; with a performance of the same locomotives without the expert instruction.

Question 32 asks what changes have been made in the methods of firing and what new devices for reducing coal consumption have been adopted since June 30, 1910, and what the result of the adoption of the new methods or devices has been.

Question 33 calls for a statement of the number of locomotives in use on June 30, 1910, and on June 30, 1913, having brick arches, superheaters, mechanical stokers or feed water heaters.

Questions 34 and 35 call for the following information in regard to rails for the fiscal year ended June 30, 1913: Tons, weight, kind, section, maker, date rolled, and cost per ton delivered on the carrier's line, laid on account of renewal; and the same for rails laid on account of construction or additions and betterments, and the operating division; the number of rails, kind, weight, and section, name of maker, date rolled, datelaid, date taken up, cause of removal and labor cost incident to taking up old rail and installing new rail for the renewal of rails. This information is required for one representative division only.

Question 36 calls for the following information in regard to accidents resulting from rail failures since July 1, 1909; date and location of accident, course of train, cause of accident; kind weight, section, maker, date rolled and date put in track of rail causing wreck; and the cost of clearing wreck, cost of repairing roadbed, cost of repairs to equipment, and the payments for loss and damage to freight or baggage and injuries to persons.

Question 37 calls for copies of all contracts for the construction or renewal of roadbed, bridges or structures, or for facilities entered in 1910, 1911, 1912 and 1913.

Question 38 calls for a statement of the total number of cars; the total number of car-days; the loaded car miles and the empty car miles of freight cars in revenue service on respondent's lines in October, 1913.

Question 39 asks for the following information in regard to fifty box cars—twenty-five, of 60,000 lbs. capacity each, and tweny-five, of 80,000 lbs. capacity each—which were in use during the entire period, July 1, 1908, to June 30, 1913. Car number the date and from and to movement; the loaded, empty and total mileage, and the commodity, tons and ton miles lading.

Question 40 asks for a statement for the amount of expenditures made by the respondent during the period of five years

ended June 30, 1913, for heavy rails, increased strength of bridges, culverts, etc., necessitated by the use of the present heavy types of equipment.

Question 41 asks for the full results of any investigations that have been made to determine to what extent cost of maintenance of roadbed and bridges has been increased by the introduction and use of heavier types of locomotives and cars; and a statement of the names of those who have made such investigations.

Question 42 asks for a statement as to whether or not the railroad's investment in equipment has been increased or decreased through the introduction of heavier power and cars based on estimate, assuming that it were necessary to carry the tonnage of the year ended June 30, 1913, with the equipment of the types in use in 1903.

Question 43 asks what investigation has been made by the respondent to determine the relative cost of maintaining heavier locomotives and larger capacity cars and the comparative cost of maintaining steel or steel underframe cars with that of maintaining wooden cars, and calls for the result of such investigations.

Question 44 asks for the result of any investigation that has been made to determine the relative transportation cost per unit of freight handled by heavy locomotives and cars of large capacity, as compared with the cost of handling with the types of equipment used in 1903.

Question 45 asks for the results of any investigations that have been made as to the relative cost per unit, including transportation expenses and maintenance expenses; of the change of policy which brought about the use of heavier power and cars.

Question 46 asks for figures showing the net tonnage of lading per car in 1903 and 1913, and the ratio of weight of lading to tare weight for each of the years 1903 to 1913.

Question 47 asks for the following information in regard to the consolidation of traffic at points off the line of the respondent during the year ended June 30, 1913; location of office; number of employees; amount of salaries; rent of offices; personal and traveling expenses; office and incidental expenses, and total expenses.

Question 48 is as follows: Describe the measures taken by the respondent company to verify the correctness of charges shown on waybills taken into account. Give (a) the percentage of waybills received which were tested as to correctness of charges by others than station employees during year ended June 30, 1913; (b) the number and gross amount of undercharges discovered; (c) the number and gross amount of overcharges.

Question 49 is as follows: (a) What investigation (if any) has been made by respondent to determine the saving in operating expense that would be effected by the adoption of universal through billing of its interline shipments? (b) What was the result of such investigation? (c) What proportion of respondent's interline shipments (forwarded and received) is now moved on through billing, and how does this proportion compare with that which obtained in 1908?

Question 50 is as follows: (a) What investigation (if any) has been made by the respondent to determine the cost of service or services beyond its own tracks involved in placing or "spotting" a car on a private track, for loading or unloading? (b) State specifically the extent and kind of service that was investigated and the different elements of cost that were considered; also show whether the private track service investigated was that upon a single siding or upon a system of plant tracks. (c) Submit in detail the results of such investigation. (d) What has the respondent found to be the approximate cost of a normal or average switching movement involved in placing a car for loading or unloading on a private track?

Question 51 asks for the following information for the years preceding 1899, and for each year separately since 1898: Total net charges to road and equipment account and the classification of these charges as between those due to extension and additions and betterments; those due to purchase or absorption of other roads; and those due to adjustment of accounts.

Question 52 asks for the following information for the period July 1, 1898, to June 30, 1913, inclusive, in regard to charges to road and equipment account for properties acquired: Name of company and kind of business performed; date acquired; the book value of the property acquired divided as between amount carried on books of vendor company and amount changed by vendee or respondent on its books; consideration for property acquired showing money or other medium; and securities issued, assumed or exchanged, with the name of the security, par value and market value at date of exchange.

Question 53 asks for the following information in regard to the sources of money spent and charged to road and equipment from July 1, 1898, to June 30, 1913, inclusive, showing separately by years money from sale of property other than road and equipment; money from income or surplus funds; money from the sale of securities; money taken from working capital; and the total; each of these to be divided as between money spent for road and money spent for equipment.

Question 54 asks for the following information in regard to physical property other than road and equipment owned by the railroad on June 30, 1913: Location of property; description; date acquired; actual cost to carrier; book value on June 30, 1913; explanation of difference between actual cost and book value; general balance sheet account in which carried on June 30, 1913; value assessed for taxation; revenue during the year ended June 30, 1913; expenses, including taxes and net income or loss for 1913; total income from date acquired to June 30, 1913; if mortgaged, under what mortgage; market value as of December 15, 1913.

Question 55 requires the following information regarding the securities of other companies owned on June 30, 1913, divided as between securities of proprietary, affiliated and controlled companies whose property is used or forms a part of the railroad system, and companies not forming a part of the transportation system: Name of issuing company; class of company and nature of business; par value and book value of pledged and unpledged securities; date acquired; actual cost to respondent, and explanation of the difference between actual cost and book value; general balance sheet account in which carried; rate of dividend or interest during the fiscal year ended June 30, 1913; income for that year; total income from date acquired to June 30, 1913; and market value as of December 15, 1913.

Question 56 requires the following information in regard to a comparison of the securities of other companies owned on June 30, 1898, June 30, 1907, and June 30, 1913: Name of company; total par value; book value.

Question 57 requires the following information in regard to securities of respondent and of other companies acquired during the period July 1, 1898, to June 30, 1913: Name of company and nature of business; purpose of acquisition and date; kind of security; date of maturity; interest or dividend rate; par value; market value at date of transfer; cost to respondent showing separately conditions and expenses of acquisition and purchase price; cash or properties other than securities, and kind and value of securities issued or assumed or exchanged given as consideration for securities acquired; names and addresses of persons through whom acquired.

Question 58 calls for the same kind of information for securities disposed of by the respondent during the period July 1, 1898, to July 1, 1913.

Question 59 calls for the following information in regard to each class of security issued by the respondent and outstanding on July 1, 1898, and issued during the period July 1, 1898, to June 30, 1913: Date of issue of maturity; purpose of issue; rate of interest or dividend; total par value; discount, premium, commission; expenses in connection with issue; net proceeds; disposition of securities or proceeds; collateral pledged as se-

curity; provisions for retirement; and name and address of banking or brokerage house or other financial institution or individual through whom securities were sold or disposed of.

Question 60 calls for a recapitulation of the purposes of the issue of securities during 1898 to 1913 period.

Question 61 calls for the following information in regard to contingent liabilities on June 30, 1913: Name and kind of business of company; date of agreement; disposition of property and value; amount of liability for principal income and operating deficits; offset to contingent liability through value to accrue if liability becomes actual and amount of security provided against liability; names of other companies jointly liable with respondent.

Question 62 calls for a contingent comparative statement of assets and liabilities with averages per mile of road owned for years ended June 30, 1898, June 30, 1907, and June 30, 1913; the preparation of this statement involving a re-costing of former balance sheet so as to conform with the present requirements of the Interstate Commerce Commission.

Conflicting Interests.—Question 63 calls for the following information in regard to contracts and interests of officers or directors in transactions of the company during the year ended June 30, 1913: Description of the transaction; date contracted or performed; parties other than respondent; names of respondent's directors or officers interested; nature of interest, and remarks. With this is to be included a statement in writing from each officer whose name and address is listed under Question 5 as to whether or not he is financially interested in any concern with which the respondent has had transactions during the year ended June 30, 1913.

Sleeping Car Operations.—Question 64 calls for the following information in regard to contracts having to do with sleeping car companies and covering sleeping car operations for the period July 1, 1898, to December 31, 1913; Parties to the contract; date of contract; effective date; date of expiration; date canceled; date of acquisition or control of the subsidiary company.

Question 65 calls for information showing the name, post office address, date elected and date of expiration of term of all directors of the respondent and of its subsidiaries whose terms embraced any part of the years 1898 to December 31, 1913, during which contracts with sleeping car companies were made or in force.

Question 66 calls for the following detailed information in regard to sleeping car operations borne by the respondent or its subsidiaries during the first and the last year of the life of each contract: Cost of cleaning and washing outside of cars, inside of cars; cost of furnishing and applying lubricating material, ice, heating, lighting, etc.; cost of replacing bell cords, couplers, air brake hose, etc.; payment of amounts determined on a mileage or other basis to cover the use and maintenance of cars; cost of all damages to sleeping cars resulting from accident, except those due to acts of employees of the sleeping car company.

Question 67 requires an itemized statement of amounts paid by sleeping car companies to the respondent and to subsidiaries.

General.—Question 68 is as follows: Does the respondent, to any extent, classify its operating expenses to determine the cost of freight service, passenger service, express service, postal service, or of any particular class of service? If so, state fully the extent and the methods employed in such classification of expenses.

Question 69 is as follows: (a) Have any investigations been made to determine to what extent freight service, passenger service, express service and postal service are respectively remunerative to the respondent? (b) By whom were such investigations made? (c) Give fully the figures compiled as to each of such investigations and the basis for them. (d) As to the postal service, show for the year ended June 30, 1913, the amount which was received and the amount which in the judgment of the respondent should have been received as proper remuneration for the service performed.

Question 70 calls for information showing in detail annual and term passes issued during 1913 up to November 30, 1913.

Question 71 calls for the following information in regard to the handling of private cars other than cars of the respondent's officers and employees during the fiscal year ended June 30, 1913: Date of movement; car initial and number; kind of pass; number of pass; name in whose favor issued and address, and the account on which the pass was issued, of all passes on which each car moved; points between which moved; approximate cost for the handling; revenue at tariff rate.

Question 72 calls for the following details of information in regard to unproductive expenditures for permanent improvements made since July, 1898, to June, 1913; description of work; reason for expenditure (governmental regulation or otherwise); period during which expenditures were made; total amount expended; expenditure charged to operating expenses, income and profit and loss, road equipment, other accounts; and the same for unproductive expenditures other than permanent improvements.

Question 73 calls for the following information in regard to charges for equipment renewals on account of equipment retired from June 30, 1908, to June 30, 1913, inclusive: Kind of equipment; cost or record value; rate of depreciation; amount of depreciation charged to operating expenses, income, profit and loss, other accounts; estimated proportion of depreciation that accrued to June 30, 1907.

Question 74 calls for the following information in regard to equipment retired, destroyed or otherwise disposed of from June 30, 1908, to June 30, 1913: Kind of equipment; average age of retirement; number of units; cost or record value; accounts to which value was distributed, salvage, reserve for accrued depreciation, operating expenses, profit and loss, individuals and companies, other accounts.

Question 75 calls for the following information in regard to officers and employees receiving $10,000 or more as remuneration for the year ended June 30, 1913: Name; title or position; department; nature of duties; length of service with respondent; time devoted to the service of respondent during the year; salary per annum; fees, donations, bonuses, gifts or other emoluments received during the year; total remuneration, salary or other remuneration received from companies other than the respondent, with the name of the company and the amount received.

Question 76 calls for detailed information showing form of payment; nature of charge; voucher number, with name and address of employee, and the nature of service for all charges "to other expenses" under each of the five general classes of expenses during the period July 1, 1907, to December 1, 1913.

Question 77 calls for detailed information showing the name and address, date of payment, amount of payment and purpose for which payment was made, and particulars with respect thereto of payments for special purposes during the period July 1, 1908, to December 1, 1913. This includes payments to legislative councils, political campaigns, special counsel, for entertaining public officers, and for payments to newspapers and periodicals for advertising or other publicity or for influencing public opinion, excluding expenses incurred for the printing and distribution of time tables, etc.

Question 78 calls for a detailed account of the amount and name and address of the payee and description of service rendered of all expenditures made or incurred during the period July 1, 1908, to date, for the purpose of securing publicity in relation to the need of higher rates for transportation service.

REDUCED RATES BETWEEN CHILI AND ARGENTINA.—An agreement has been arrived at for a lowering of the Transandine Railway's freight rate between Chili and Argentina. The aim, of course, is to promote trade between the two countries, and it is expected that the governments of the two countries will give their approval.

RECENT POWER FOR THE ROCK ISLAND LINES

By W. J. TOLLERTON,

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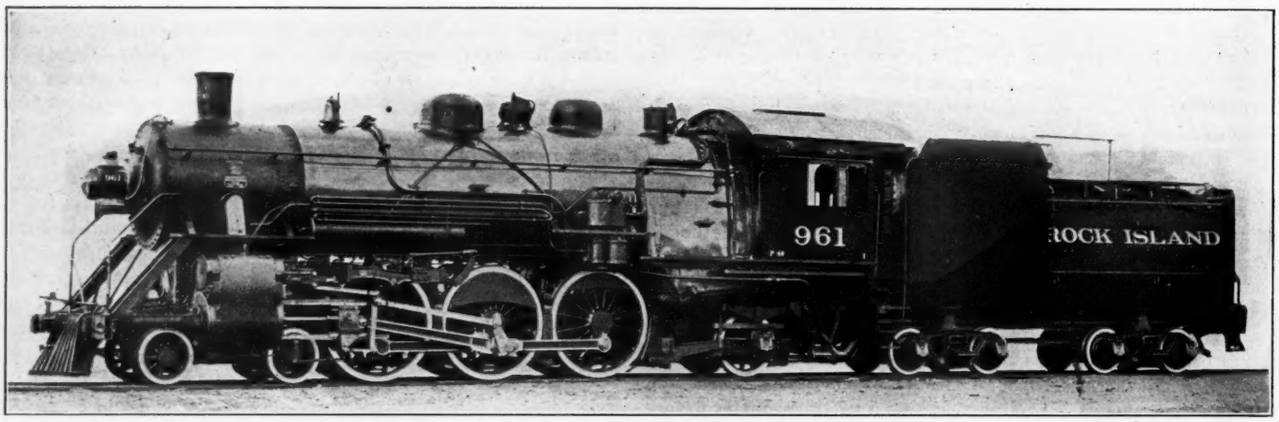
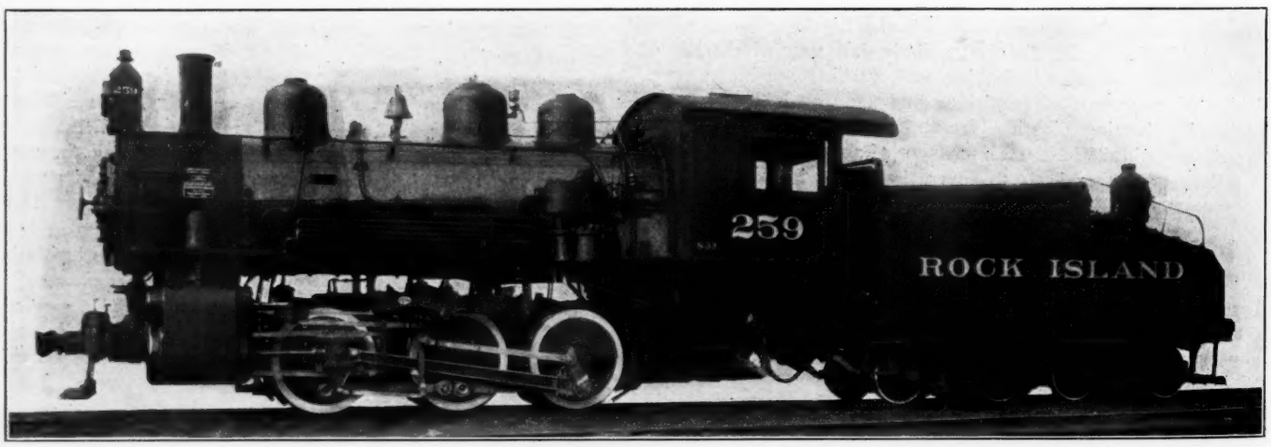
During the past year 137 new locomotives have been delivered to the Rock Island Lines in order to handle the larger and heavier trains and to reduce operating costs. The increase in the size of power units is a direct result of the growth in traffic and the rapid increase in the use of steel equipment. Rock Island passenger train statistics for the year ending June 30, 1913, show that of the total passenger train cars, exclusive of Pullman equipment, run in main line trains, 51 per cent. were of all-steel construction, and of the total mileage made by passenger train cars, exclusive of Pullman equipment, 40 per cent. was made by cars of all-steel construction. From this it is evident that large passenger power is as necessary as large freight power in order to ably care for the movement of traffic. Seventy-five of these new locomotives are for freight service and are of the Mikado type (2-8-2); 30 are six-wheel switchers (0-6-0); two are passenger locomotives of the Mountain type (4-8-2), and 30 are Pacific type (4-6-2) passenger locomotives.



Pacific Type Locomotive Used on the Rock Island Lines

Sixty-five of the 75 Mikado locomotives were built by the Baldwin Locomotive Works and 10 by the American Locomotive Company. All of these locomotives have a tractive effort of 57,000 lb., 28 in. x 30 in. cylinders, and are equipped with brick arches and superheaters. The tenders are all of the Vanderbilt type. The engines built by the Baldwin Locomotive Works were on two orders embracing locomotives in series No. 2,500 to 2,539, and in series No. 2,550 to 2,574, all of which were equipped with the Baker valve gear and air reverse. The last 25 locomotives, series No. 2,550 to 2,574, also have the Mudge-Slater front end and the Chambers throttle valve. In the series from 2,500 to 2,539, the locomotives have a weight on drivers of 243,200 lb., and a total weight of 318,850 lb. In the series from 2,550 to 2,574, the locomotives have a weight on drivers of 238,200 lb. and a total weight of 319,300 lb. The ten Mikado locomotives built by the American Locomotive Company were equipped with the Walschaert valve gear and screw reverse; they have a weight on drivers of 238,000 lb., and a total weight of 320,000 lb. A more detailed description of these locomotives was published in the *Railway Age Gazette* of August 23, 1912, on page 352 of that number.

The Mikado locomotives have all proven to be excellent steamers; there is experienced no difficulty in maintaining full boiler pressure at all times and the absence of black smoke at the stack is evidence of their boiler efficiency. The air and screw reverse have been found to be a decided improvement over the old method. They lighten the work of the engineer and give him a better opportunity to more carefully regulate the cut-off. In order to prevent coal falling from the tender, an extension flare has been added to the top of the tank with very satisfactory results. Except in unusual cases, it is not necessary for the fireman to reach further back than the coal gate at any time for a full scoop of coal. Special efforts were made to locate the gages so that they may be easily observed by the enginemen. They are placed down on the back head of the boiler.



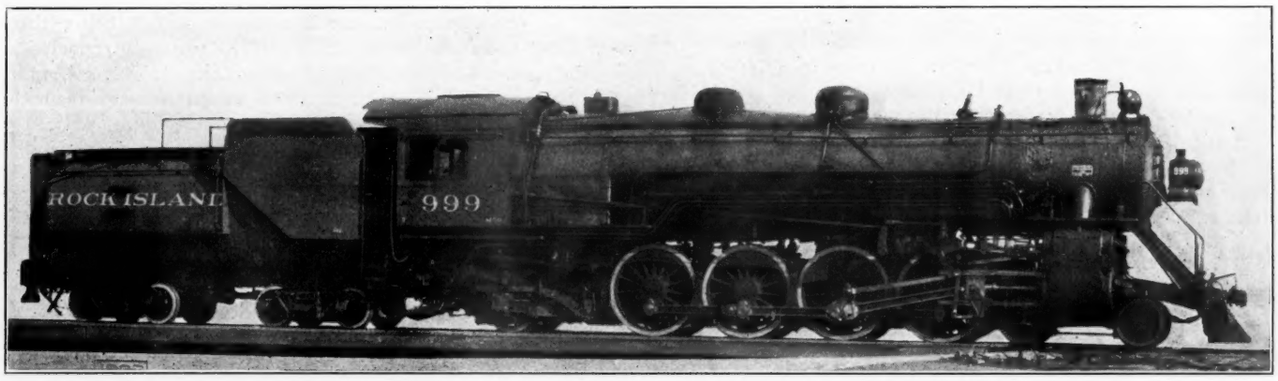
Rock Island Switching Locomotive That is Giving Good Service

The Mikado locomotives have handled red-ball and drag freights equally as satisfactorily as the consolidation locomotives. These locomotives are operating on various divisions in

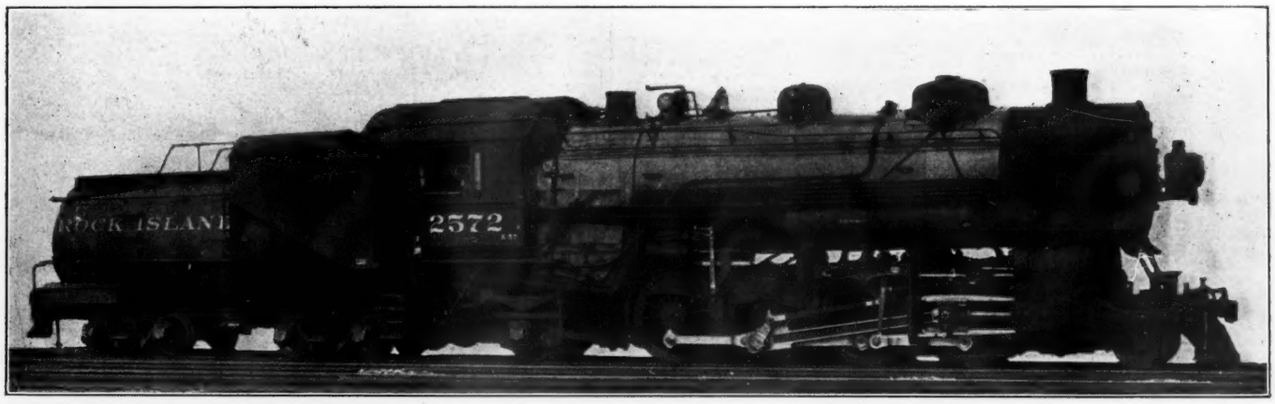
the States of Iowa, Missouri, Kansas and Colorado, and are used on all classes of freight trains with entirely satisfactory results. On the El Paso division between Herington and Pratt, Kan., a distance of 126 miles, having a ruling grade of 0.8 per cent., consolidation non-superheater locomotives with a tractive effort of 39,000 lb. handled 1,650 tons in through freight service. The Mikado locomotives, tractive effort 57,000 lb., will handle over this same track and on the same schedule, trains of 2,400 tons gross weight, an increase of 750 tons or 45 per cent. over the consolidation locomotives. Daily reports show that the Mikados make the trip of 126 miles on the same amount of coal as consumed by the consolidation, viz., 10 tons. The average consumption of coal per 1,000 gross ton miles with the consolidation locomotive was 96 lb. as compared with 66 lb. for the Mikado, a decrease of 30 lb. per 1,000 gross ton miles, or 31 per cent. On other divisions the Mikado locomotive has proven itself to be a decided factor in fuel economy, there being large reductions in fuel consumption where the traffic is such as to permit the locomotives to haul their full rating. The performance of the Mikado locomotives thus far indicates their value for this class of service.

The 30 six-wheel switching locomotives, Nos. 230-259, were built by the American Locomotive Company at the Richmond Works. These locomotives have a tractive effort of 33,400 lb., 20 in. x 28 in. cylinders, and a weight on drivers and total weight of 161,000 lb. They are equipped with the Baker valve gear, Chambers throttle valve, Mudge-Slater front end, and the brick arch. The last two, Nos. 258 and 259, are equipped with superheaters. These locomotives have been distributed to the various parts of the system, and are rendering excellent service. In Chicago some of them are in transfer service, having replaced consolidation locomotives, and are handling heavy drag trains very satisfactorily. They are very free steamers, and a noticeable reduction has been made in fuel consumption in switching service on the divisions on which they are in service. The locomotives equipped with the superheaters consume 20 per cent. less fuel than similar locomotives using saturated steam in like service.

The new Mountain type locomotives, Nos. 998 and 999, are to be used in fast passenger service on the Colorado division. Their introduction has enabled the consolidation of the St. Louis and Chicago sections of one of the Colorado passenger trains, between Phillipsburg, Kan., and Limon, Col., in both directions. This will effect an annual reduction of 180,310 passenger train miles. That part of the division over which they will operate is a steady up-hill pull westbound from Phillipsburg for 247 miles. The ruling grades are 53 feet to the mile. In this service, it is expected that these locomotives will haul trains of 1,000 tons in 16 cars at an average speed of 31 miles per hour, including 10 stops. These locomotives were built by the American Locomotive Company and are equipped with superheaters, combustion chambers, the brick arch, screw reverse, and the Baker valve gear. The main rods are shortened and connected to the second pair of drivers in place of the third pair. They also have electric arc headlights with an auxiliary incandescent light, speed recorders, Chambers throttle valves and non-lifting injectors, as well as steam jet smoke consumers. They have a total weight of 333,000 lb. and a weight on drivers of 224,000 lb.; their maximum tractive effort is 50,000 lb.



Mountain Type Locomotives on the Rock Island Will Effect an Annual Reduction of 180,310 Passenger Train Miles



Mikados are Using 30 Per Cent Less Fuel Than Previous Consolidations

The efficient operation of passenger trains when they are run on a fast competitive schedule, requires that a passenger locomotive must have both a high starting tractive effort and a relatively high sustained tractive effort for high speeds. This has been very successfully met by designing the new Pacific type locomotives with a sufficiently large boiler capacity, having an evaporating heating surface of 3,498 sq. ft., a superheating surface of 805 sq. ft., and a grate surface of 63 sq. ft. These locomotives, series Nos. 950 to 979, have cylinders 25½ in. x 28 in.,

a total weight of 281,500 lb., and a weight on drivers of 174,500 lb.; their maximum tractive effort is 40,300 lb. The special features are in general the same as those on the Mountain type locomotives.

The performance of these locomotives has in a measure exceeded the expectations. A record of their operation shows that they have successfully handled solid steel passenger trains of 900 tons in 12 cars, on a one per cent. grade, 6 miles long, at an average speed of 27 miles per hour, when the speed at the foot of the hill was only 35 miles per hour. Other tests of these Pacific type locomotives clearly indicate that a train of mixed steel and wooden equipment of 15 cars, with an average weight per car of 58 tons, or a train weight of 870 tons, exclusive of lading, can be handled on a one per cent. grade, seven miles long, at an average speed of 41 miles per hour by operating the locomotive at a 13 in. cut off, when the speed of approach is 50 miles per hour. Since these locomotives have been assigned to regular service, their performance has not only met but exceeded that stipulated.

The principal dimensions, weights and ratios for the four different types of locomotives recently delivered to the Rock Island Lines are as follows:

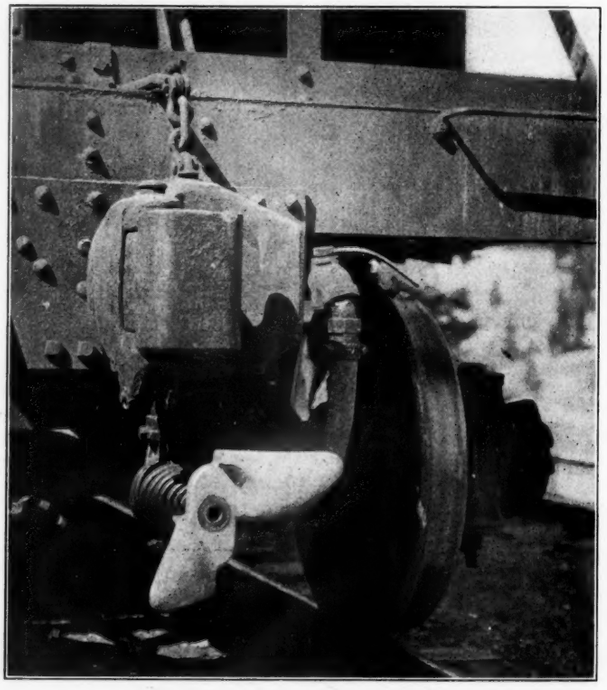
Locomotive numbers	2500-2574	230-259	998-999	950-979
Type	2-8-2	0-6-0	4-8-2	4-6-2
Service	Freight	Switching	Pass.	Pass.
Fuel	Bit. coal	Bit. coal	Bit. coal	Bit. coal
Tractive effort, lb.	57,000	33,400	50,000	40,250
Weight, total, lb.	319,300	161,000	333,000	281,500
Weight on drivers, lbs.	238,200	161,000	224,000	174,500
Weight on leading truck, lb.	29,000	.....	57,500	53,000
Weight on trailing truck, lb.	52,100	.....	51,500	54,000
Weight on engine and tender, lb.	480,000	267,200	490,500	441,300
Wheel base, driving, ft. & in.	17—0	11—0	18—0	13—0
Wheel base, total, ft. & in.	35—2	11—0	38—11	33—10
Wheel base, engine and tender, ft. & in.	67—0½	42—6	70—2¼	65—1¼
Ratios				
Weight on drivers ÷ tractive effort	4.18	4.88	4.48	4.33
Total weight ÷ tractive effort	5.60	4.88	6.66	6.98
Tractive effort × diam. drivers ÷ heat. surf.*	638.29	704.70	623.53	625.00
Heating surface ÷ grate area	89.25	76.81	88.24	74.80
F. B. heat. surf. ÷ evap. heat. surf., per cent	6.06	6.80	7.58	6.80
Weight on drivers ÷ heating surf.*	42.34	66.12	40.48	37.10
Total weight ÷ heating surf.*	56.96	66.12	60.18	59.75
Volume both cylinders, cu. ft.	21.36	10.20	19.94	16.54
Heating surf.* ÷ volume of cylinders	263.50	238.50	277.50	284.50
Grate area ÷ volume of cylinders	2.95	3.12	3.14	3.81
Cylinders				
Kind	Simple	Simple	Simple	Simple
Diameter and stroke, in.	28 x 30	20 x 28	28 x 28	25½ x 28
Valves				
Kind	Piston	Piston	Piston	Piston
Gear	10 Walschaert, 65 Baker	Baker	Baker	Baker
Wheels				
Driving, diam. over tires, in.	63	52	69	73
Driving, thickness of tires, in.	3½	4	3½	3½
Driving journals, main, diam. and length, in.	11½ x 13	9 x 12	11 x 22	11 x 22
Driving journals, others, diam. and length, in.	11 x 13	9 x 12	11 x 13	11 x 13
Engine truck wheels, diam., in.	33	...	34	34
Engine truck journals, in.	6½ x 12	...	7 x 12	6½ x 12
Trailing truck wheels, diam., in.	42	...	42	45
Trailing truck journals, in.	9 x 14	...	9 x 14	9 x 14
Tender wheels, diam., in.	33	33	33	34
Tender journals, in.	6 x 11	5 x 9	6 x 11	6 x 11
Boiler				
Style	Straight	Straight	Conical	Ex. W. T.
Working pressure, lbs. per sq. in.	180	180	185	190
Outside diam. of first ring, in.	86	63 5/16	78	76⅜
Firebox, length and width, in.	108 x 84	68 x 67¼	107 7/16x84	108 x 84
Tubes, number and diam., in.	234—2¼	151—2	207—2¼	195—2¼
Flues, number and diam., in.	36—5½	21—5½	36—5½	34—5½
Tubes and flues, length, ft. & in.	21—0	16—0	22—0	22—0
Heating surf., firebox, sq. ft.	230	114	287	213
Heating surf., tubes, sq. ft.	4,017	1,738	3,805	3,260
Heating surf., arch tubes, sq. ft.	29	13	25	25
Heating surf., total	4,276	1,865	4,117	3,498
Superheating surf., sq. ft.	900	380	944	805
Grate area, sq. ft.	63	31.7	62.7	63.0
Tender				
Water capacity, gal.	9,000	5,000	8,500	8,500
Coal capacity, tons	16	7½	14	14

*Equivalent heating surface equals evaporating surface plus 1.5 times superheating surface.

TEST OF THE ROBINSON AIR HOSE CONNECTOR

The Robinson automatic connector, for coupling the air brake connections between freight cars automatically, when the cars come together, without the intervention of the trainman, has been in use for some time past on 50 large-capacity steel ore cars on the Great Northern, and in September last a representative of the Interstate Commerce Commission made tests with trains equipped with the connector on the Marcus division of the road between Phoenix, B. C., and Grand Forks. The distance between these places is 27 miles and the cars are run in regular service over this line. The road is very steep and crooked, some grades being three per cent. and some curves 22 deg. The tests are reported as entirely successful, and the proprietor, The Robinson Coupler Company, Washington, D. C., has a communication from the commission embodying the following conclusions:

"From information obtained in this test, the conclusion is reached that the Robinson connector is a safe and practicable device, which, if properly installed and maintained, will meet the need for an automatic connector in general freight service and add to safety in train operation on a railroad using it.



Application of Robinson Automatic Connector to Freight Car

"It is mechanically simple in construction and composed of few parts, which are easily assembled. It is comparatively light in weight, and of ample strength to withstand all shocks to which it is likely to be subjected in ordinary service. Its gathering range is sufficient to meet all variations between cars in service where car couplers can be made to operate, and it will withstand severe distortion without damage when heads are forced together under conditions where car couplers will not operate. It will maintain a tight joint between connector faces, even when gaskets are worn to such an extent that they could not be used with the standard hose coupling, and its use would materially reduce train pipe leakage."

Increased Capital for British Railway.—The Midland having certain new projects and extensions to provide for is seeking the sanction of Parliament to increase its capital $5,000,000.

TABLE I,—SUMMARY OF INSTANCES IN WHICH EMPLOYEES IN TRAIN SERVICE WERE ON DUTY MORE THAN SIXTEEN

Note.—The items shown in heavy figures refer to instances of excess service attributable to causes arising subsequent to 14 hours from the time the men involved respectively w

Name of Railroad	Inclusive Periods of Contin: 16 to 17		17 to 18		18 to 19		19 to 20		20 to 21		21 to 22		22 to 23		23 to 24		24 to 25		25 to 26		26 to 27		27 to 28		28 to
Atchison, Topeka & Santa Fe	757	**252**	829	**65**	426	**31**	281	**34**	159	**18**	93	**3**	92	..	29	**10**	45	**4**	16	..	19	**3**	17	**2**	7
Atlantic Coast Line	126	**82**	117	**32**	94	**18**	51	**17**	32	**5**	10	**7**	33	..	2	**5**	5	**5**	5	..	..	..	3	..	1
Baltimore & Ohio	5253	**1097**	5262	**711**	3416	**347**	1970	**164**	1264	**136**	797	**116**	679	**40**	346	**24**	259	**16**	147	**20**	101	**24**	84	**13**	69
Boston & Maine	282	**342**	241	**133**	162	**45**	119	**13**	49	**3**	37	**2**	26	**11**	9	..	3	**3**	12	**2**	..	..	..	..	..
Chesapeake & Ohio	1200	**272**	1114	**178**	541	**117**	444	**35**	226	**32**	154	**20**	131	**25**	79	..	56	..	36	**7**	38	**5**	5	..	5
Chicago & North Western	194	**97**	148	**31**	76	**7**	75	**6**	35	**5**	34	**2**	12	..	9	..	13	..	..	**5**	10	..	..	..	..
Chicago, Burlington & Quincy	1139	**583**	1272	**241**	600	**88**	305	**42**	188	**33**	127	**23**	43	**6**	57	**8**	15	..	15	..	7	..	8	..	4
Chicago, Milwaukee & St. Paul	1020	**836**	944	**405**	644	**155**	454	**104**	299	**32**	154	**36**	110	**15**	89	**14**	55	**23**	20	**5**	29	**1**	24	..	10
Chicago, Rock Island & Pacific	346	**401**	340	**249**	203	**135**	124	**63**	72	**26**	46	**13**	28	**2**	13	**18**	21	**5**	15	..	..	..	..	**3**	6
Cleveland, Cincinnati, Chicago & St. Louis	417	**117**	573	**77**	459	**42**	260	**30**	206	**36**	112	**15**	62	**10**	65	..	25	**5**	14	..	5	..	5	**5**	..
Delaware, Lackawanna & Western	263	**97**	205	**6**	77	**21**	43	**9**	38	..	21	..	11	..	13	..	10	..	..	..	..	..	5	..	..
Erie	1294	**507**	1269	**265**	819	**109**	495	**31**	241	**9**	100	**14**	87	**4**	51	**9**	32	..	17	**11**	2	..	8	..	2
Great Northern	335	**279**	615	**181**	521	**76**	336	**47**	183	**33**	67	**22**	33	**8**	43	**12**	50	**15**	12	**2**	10	**3**	3	..	2
Illinois Central	2577	**1948**	4833	**1623**	2577	**548**	1442	**286**	895	**178**	676	**97**	413	**41**	310	**30**	174	**39**	106	**3**	69	**16**	68	**17**	42
Lake Shore & Michigan Southern	215	**96**	240	**49**	234	**19**	160	**5**	89	**7**	58	**5**	35	..	36	..	28	..	20	..	12	..	12	**5**	7
Lehigh Valley	204	**24**	284	**14**	213	**9**	158	..	116	**6**	70	**6**	91	**13**	43	**10**	25	**3**	15	**10**	33	..	27	..	2
Louisville & Nashville	1257	**491**	1238	**241**	822	**158**	410	**60**	346	**54**	213	**57**	154	**9**	66	**18**	96	**22**	46	**8**	14	**5**	11	**2**	6
Michigan Central	164	**102**	274	**78**	173	**21**	66	**6**	61	..	33	**5**	15	..	15	**3**	15	**2**	20	..	..	..	5	..	..
Minneapolis, St. Paul & Sault Ste. Marie	175	**111**	260	**47**	156	**30**	105	**11**	60	**16**	24	**8**	36	**7**	27	**5**	10	..	9	..	7	..	..	..	5
Missouri Pacific	380	**202**	438	**119**	235	**70**	134	**15**	99	**9**	51	..	49	..	38	**1**	32	..	5	..	..	..	5	..	5
New York Central & Hudson River	4527	**952**	4415	**575**	2266	**181**	1355	**122**	751	**65**	392	**33**	255	**12**	131	**10**	87	**4**	38	..	24	..	27	..	3
New York, New Haven & Hartford	100	**41**	110	**67**	51	**31**	42	**27**	20	**10**	8	**23**	4	**9**	13	**4**	11	**8**	10	**1**	2	..	5	..	5
Norfolk & Western	1589	**158**	1556	**81**	737	**57**	375	**11**	254	**10**	129	**6**	78	..	34	..	18	**11**	40	..	10	..	8	..	16
Northern Pacific	1341	**760**	1390	**397**	835	**180**	575	**93**	350	**83**	210	**44**	111	**16**	73	**27**	87	**23**	36	**15**	38	..	18	..	27
Pennsylvania Lines West	4153	**864**	4139	**495**	2993	**237**	2182	**146**	1590	**98**	1165	**51**	838	**41**	566	**13**	367	**32**	338	**16**	273	**8**	125	**2**	111
Pennsylvania	1480	**319**	1047	**129**	593	**52**	330	**20**	166	**22**	85	..	92	..	101	..	23	..	43	..	24	..	7	..	10
Philadelphia & Reading	175	**67**	158	**23**	76	**12**	44	**7**	49	**5**	14	**1**	23	..	13	..	..	..	..	..	5	..	..	..	..
Pittsburgh, Cincinnati, Chicago & St. Louis	1579	**413**	995	**118**	613	**44**	406	**39**	261	**19**	181	**9**	96	..	77	**10**	51	**2**	65	**2**	49	..	32	**3**	47
St. Louis & San Francisco	920	**660**	880	**319**	473	**136**	291	**55**	173	**36**	111	**27**	59	**18**	63	**12**	49	**3**	16	**1**	..	**3**	12	..	14
St. Louis, Iron Mountain & Southern	343	**151**	457	**154**	332	**70**	177	**36**	95	**21**	61	**22**	66	**2**	6	**9**	21	**2**	23	**2**	1	..	4	..	..
Seaboard Air Line	393	**138**	351	**122**	242	**19**	171	**35**	120	**12**	96	..	60	..	42	..	30	..	14	..	5	**4**	6	..	..
Southern Pacific Co. (Pacific System)	373	**80**	326	**46**	204	**22**	151	**10**	82	..	30	**12**	30	..	18	..	7	**5**	18	..	7	..	8	..	3
Southern	1388	**317**	1557	**288**	1046	**67**	583	**40**	332	**36**	177	**11**	118	..	66	..	84	**12**	22	..	40	..	4	..	15
Union Pacific	60	**47**	34	**20**	17	**2**	15	..	5	..	9	..	..	..	3	..	2	**1**	..	..	1	..	..	..	2
Wabash	2573	**1831**	1948	**614**	969	**273**	522	**103**	358	**58**	197	**27**	132	**11**	57	**11**	33	**18**	26	**10**	21	**1**	10	**5**	..

TABLE II.—ANALYSIS OF PRIMARY CONTRIBUTING CAUSES OF DELAYS

Note.—The items shown below in roman figures (exclusive of combined totals) refer to instances of excess service attributable to delays *directly* affecting the trains on which the me in relation with which such trains may have been running at the time. Where several delays have been reported by a carrier as responsible for a single instance of excess servi period, has been considered as the primary cause of such excess service.

Name of Railroad	Engine Delays: Taking or running for water		Cleaning fires		Miscellaneous mechanical defects		Engine not steaming: Poor coal		Bad water		Leaking		Collisions		Derailments		Track defects and obstructions not resulting in collision or derailment		Landslides, high water, and fire		Adverse weather conditions	
Atchison, Topeka & Santa Fe	11	...	...	...	356	**123**	...	...	...	...	66	**34**	69	**92**	471	**454**	243	**61**	87	...	22	...
Atlantic Coast Line	...	...	...	...	31	**5**	...	...	5	...	5	...	9	**11**	121	**296**	10	...	5	...	...	...
Baltimore & Ohio	275	**72**	77	**10**	524	**475**	103	**53**	26	**44**	731	**551**	253	**1047**	1958	**3760**	796	**73**	1209	**34**	122	...
Boston & Maine	48	**21**	5	...	109	**28**	9	...	6	...	20	...	29	**31**	112	**265**	30	**7**	69	...	2	...
Chesapeake & Ohio	41	**47**	5	...	193	**66**	12	**5**	5	...	5	**15**	55	**35**	581	**827**	245	**85**	92	**5**	25	...
Chicago & North Western	32	...	5	...	5	...	...	...	...	...	...	...	24	...	122	**153**	28	...	19	...	108	5
Chicago, Burlington & Quincy	16	...	...	...	335	**96**	...	...	5	3	59	**20**	65	**51**	548	**505**	69	**11**	127	...	153	7
Chicago, Milwaukee & St. Paul	11	...	2	...	195	**95**	1	...	...	1	40	**12**	86	**45**	1108	**1171**	280	**33**	253	**5**	310	17
Chicago, Rock Island & Pacific	23	**10**	...	...	80	**15**	16	...	...	...	44	**15**	32	**75**	517	**472**	33	**10**	43	**2**	43	5
Cleveland, Cincinnati, Chicago & St. Louis	...	**5**	...	...	44	**46**	...	...	5	...	54	**2**	49	**61**	409	**611**	90	**115**	209	**11**	...	...
Delaware, Lackawanna & Western	3	**6**	...	**6**	12	**20**	...	...	...	...	...	**5**	7	**33**	96	**362**	28	...	48	...	21	...
Erie	6	**2**	5	...	306	**155**	...	...	...	...	58	**18**	50	**92**	521	**1068**	122	**13**	313	**39**	25	...
Great Northern	50	**5**	...	...	60	**25**	...	...	...	...	11	**5**	115	**48**	449	**471**	197	**39**	121	**3**	396	2
Illinois Central	178	**23**	25	**5**	551	**342**	26	**20**	25	**15**	400	**178**	261	**548**	1276	**2722**	425	**57**	1431	**6**	122	45
Lake Shore & Michigan Southern	7	...	...	...	32	**22**	...	...	...	...	7	...	16	**50**	79	**156**	26	**15**	48	**84**	15	13
Lehigh Valley	...	...	...	...	37	**19**	...	...	...	...	...	...	20	**86**	334	**670**	71	...	57	...	14	...
Louisville & Nashville	36	**5**	28	...	303	**149**	...	**6**	8	...	82	**31**	92	**225**	999	**1323**	164	**48**	331	**13**	23	...
Michigan Central	...	...	...	...	89	**35**	...	...	...	...	...	**6**	7	**5**	115	**208**	10	...	51	**5**	5	15
Minneapolis, St. Paul & Sault Ste. Marie	1	...	...	...	39	**5**	...	...	...	...	7	...	40	**15**	216	**343**	75	**20**	10	...	65	9
Missouri Pacific	47	**5**	...	...	94	**23**	15	...	11	...	140	**11**	36	**21**	243	**382**	122	**5**	56	...	45	...
New York Central & Hudson River	1	...	...	...	820	**556**	23	**10**	14	**4**	211	**186**	220	**300**	740	**1516**	321	**83**	225	**122**	1035	482
New York, New Haven & Hartford	...	...	...	...	14	**7**	...	...	...	...	5	**2**	15	**49**	31	**178**	...	...	2	...	5	...
Norfolk & Western	...	...	...	...	261	**206**	15	**22**	12	**8**	134	**64**	105	**195**	332	**748**	122	**16**	230	**10**	...	...
Northern Pacific	18	**5**	18	...	129	**35**	7	...	6	...	18	**5**	196	**109**	1656	**1533**	291	**45**	360	**66**	360	33
Pennsylvania Lines West	381	**42**	24	**5**	486	**396**	21	...	29	**12**	128	**19**	181	**281**	965	**2467**	794	**20**	7374	**5**	149	...
Pennsylvania	5	...	...	...	130	**117**	2	...	7	...	69	**31**	60	**284**	317	**943**	231	**28**	318	**30**	64	146
Philadelphia & Reading	...	...	...	...	3	**18**	...	...	...	...	6	...	12	**52**	115	**206**	18	...	5	**7**	...	...
Pittsburgh, Cincinnati, Chicago & St. Louis	41	...	6	...	94	**58**	9	**2**	6	**7**	36	**41**	57	**225**	254	**354**	549	**122**	956	**4**	94	37
St. Louis & San Francisco	56	...	5	...	217	**82**	5	...	10	...	85	**32**	66	**20**	732	**797**	175	**10**	577	**6**	8	...
St. Louis, Iron Mountain & Southern	12	**4**	2	...	24	**5**	...	...	7	...	26	...	18	**28**	577	**617**	158	...	55	...	12	...
Seaboard Air Line	10	...	10	...	120	**12**	...	...	...	...	34	**5**	58	**59**	387	**547**	143	**15**	15	**23**	5	...
Southern Pacific Co. (Pacific System)	3	...	...	...	103	**62**	...	...	...	...	32	**2**	44	**15**	312	**212**	98	...	28	**22**	33	...
Southern	5	...	5	...	507	**171**	...	...	...	...	18	**15**	163	**90**	1680	**1955**	91	**5**	182	...	...	...
Union Pacific	...	...	...	...	21	...	6	...	...	...	9	...	5	...	29	**18**	10	...	28	...	48	7
Wabash	569	**41**	134	...	181	**54**	16	**5**	15	...	175	**20**	73	**118**	1016	**1341**	216	**31**	87	...	27	5

NSTANCES IN WHICH EMPLOYEES IN TRAIN SERVICE WERE ON DUTY MORE THAN SIXTEEN CONSECUTIVE HO

cess service attributable to causes arising subsequent to 14 hours from the time the men involved respectively went on duty. Railroa

INCLUSIVE PERIODS OF CONTINUOUS SERVICE IN HOU

8	18 to 19		19 to 20		20 to 21		21 to 22		22 to 23		23 to 24		24 to 25		25 to 26		26 to 27		27 to 28		28 to 29		29 to 30		30 to 31	
65	426	31	281	34	159	18	93	3	92	..	29	10	45	4	16	..	19	3	17	2	7	..	10	..	20	..
32	94	18	51	17	32	5	10	7	33	..	2	5	5	5	5	..	..	..	3	..	1	..	..	..	..	5
711	3416	347	1970	164	1264	136	797	116	679	40	346	24	259	16	147	20	101	24	84	13	69	27	62	3	44	2
133	162	45	119	13	49	3	37	2	26	11	9	..	3	3	12	2	..	..	..	..	..	..	..	..	..	..
178	541	117	444	35	226	32	154	20	131	25	79	..	56	..	36	7	38	5	5	..	5	..	5	..	..	..
31	76	7	75	6	35	5	34	2	12	..	9	..	13	..	..	5	10	..	..	..	..	..	..	..	..	..
241	600	88	305	42	188	33	127	23	43	6	57	8	15	..	15	..	7	..	8	..	4	5	5	..	..	..
405	644	155	454	104	299	32	154	36	110	15	89	14	55	23	20	5	29	1	24	..	10	7	20	5	9	..
249	203	135	124	63	72	26	46	13	28	2	13	18	21	5	15	..	..	..	..	3	6	2	7	2	..	..
77	459	42	260	30	206	36	112	15	62	10	65	..	25	5	14	..	5	..	5	5	..	..	2	..	5	..
6	77	21	43	9	38	..	21	..	11	..	13	..	10	..	..	..	..	..	5	..	..	..	5	..	..	..
265	819	109	495	31	241	9	100	14	87	4	51	9	32	..	17	11	2	..	8	..	2	..	5	..	7	..
181	521	76	336	47	183	33	67	22	33	8	43	12	50	15	12	2	10	3	3	..	2	3	..	1	..	..
623	2577	548	1442	286	895	178	676	97	413	41	310	30	174	39	106	3	69	16	68	17	42	5	64	11	10	2
49	234	19	160	5	89	7	58	5	35	..	36	..	28	..	20	..	12	..	12	5	7	..	8	..	..	..
14	213	9	158	..	116	6	70	6	91	13	43	10	25	3	15	10	33	..	27	..	2	..	13	..	7	..
241	822	158	410	60	346	54	213	57	154	9	66	18	96	22	46	8	14	5	11	2	6	..	6	..	..	..
78	173	21	66	6	61	..	33	5	15	..	15	3	15	2	20	..	..	..	5	..	..	..	..	..	..	..
47	156	30	105	11	60	16	24	8	36	7	27	5	10	..	9	..	7	..	..	..	5	..	5	..	5	..
119	235	70	134	15	99	9	51	..	49	..	38	1	32	..	5	..	..	..	5	..	5	..	1	..	..	..
575	2266	181	1355	122	751	65	392	33	255	12	131	10	87	4	38	..	24	..	27	..	3	..	5	..	7	..
67	51	31	42	27	20	10	8	23	4	9	13	4	11	8	10	1	2	..	5	..	5	5	..	..	..	..
81	737	57	375	11	254	10	129	6	78	..	34	..	18	11	40	..	10	..	8	..	16	..	7	..	..	..
397	835	180	575	93	350	83	210	44	111	16	73	27	87	23	36	15	38	..	18	..	27	12	8	..	9	8
495	2993	237	2182	146	1590	98	1165	51	838	41	566	13	367	32	338	16	273	8	125	2	111	2	68	4	35	5
129	593	52	330	20	166	22	85	..	92	..	101	..	23	..	43	..	24	..	7	..	10	..	12	..	10	..
23	76	12	44	7	49	5	14	1	23	..	13	..	..	..	..	..	5	..	..	..	..	..	..	..	..	..
118	613	44	406	39	261	19	181	9	96	..	77	10	51	2	65	2	49	..	32	3	47	2	22	5	19	..
319	473	136	291	55	173	36	111	27	59	18	63	12	49	3	16	1	..	3	12	..	14	3	8	..	..	..
154	332	70	177	36	95	21	61	22	66	2	6	9	21	2	23	2	1	..	4	..	..	..	..	1	..	..
122	242	19	171	35	120	12	96	..	60	..	42	..	30	..	14	..	5	4	6	..	..	..	5	..	15	4
46	204	22	151	10	82	..	30	12	30	..	18	..	7	5	18	..	7	..	8	..	3	2	..	..	..	..
288	1046	67	583	40	332	36	177	11	118	..	66	..	84	12	22	..	40	..	4	..	15	..	24	..	3	..
20	17	2	15	..	5	..	9	..	..	..	3	..	2	1	..	..	1	..	..	..	2	..	..	..	..	..
614	969	273	522	103	358	58	197	27	132	11	57	11	33	18	26	10	21	1	10	5	..	..	..	..	..	..

TABLE II.—ANALYSIS OF PRIMARY CONTRIBUTING CAUSES OF DELAYS—SUPPLEMENT TO

l totals) refer to instances of excess service attributable to delays *directly* affecting the trains on which the men in question were respe
e time. Where several delays have been reported by a carrier as responsible for a single instance of excess service the cause of the *lat*
service.

	ENGINE DELAYS																					
			Engine not steaming																			
g	Miscellaneous mechanical defects		Poor coal		Bad water		Leaking		Collisions		Derailments		Track defects and obstructions not resulting in collision or derailment		Landslides, high water, and fire		Adverse weather conditions		Congestion of traffic		Station work, waiting for orders, and meeting trains	
..	356	123	...	...	...	...	66	34	69	92	471	454	243	61	87	...	22	...	25	...	16	10
..	31	5	...	...	5	...	5	...	9	11	121	296	10	...	5	...	...	...	5	...	5	...
10	524	475	103	53	26	44	731	551	253	1047	1958	3760	796	73	1209	34	122	...	528	2	1037	40
..	109	28	9	...	6	...	20	...	29	31	112	265	30	7	69	...	2	...	236	...	102	13
..	193	66	12	5	5	...	5	15	55	35	581	827	245	85	92	5	25	...	42	...	35	36
..	5	...	...	...	...	...	...	...	24	...	122	153	28	...	19	...	108	5	12	...	18	5
..	335	96	...	...	5	3	59	20	65	51	548	505	69	11	127	...	153	7	42	...	10	5
..	195	95	1	...	...	1	40	12	86	45	1108	1171	280	33	253	5	310	17	181	20	81	11
..	80	15	16	...	...	...	44	15	32	75	517	472	33	10	43	2	43	5	59	...	9	...
..	44	46	...	...	5	...	54	2	49	61	409	611	90	115	209	11	...	...	30	...	...	...
6	12	20	...	...	...	...	...	5	7	33	96	362	28	...	48	...	21	...	4	...	3	...
..	306	155	...	...	...	...	58	18	50	92	521	1068	122	13	313	39	25	...	53	9	9	...
..	60	25	...	...	...	...	11	5	115	48	449	471	197	39	121	3	396	2	54	4	91	...
5	551	342	26	20	25	15	400	178	261	548	1276	2722	425	57	1431	6	122	45	4215	5	68	30
..	32	22	...	...	...	...	7	...	16	50	79	156	26	15	48	84	15	13	216	...	...	...
..	37	19	...	...	...	...	...	...	20	86	334	670	71	...	57	...	14	...	...	...	...	...
..	303	149	...	6	8	...	82	31	92	225	999	1323	164	48	331	13	23	...	50	...	58	...
..	89	35	...	...	...	...	...	6	7	5	115	208	10	...	51	5	5	15	15	5	5	...
..	39	5	...	...	...	...	7	...	40	15	216	343	75	20	10	...	65	9	12	...	11	...
..	94	23	15	...	11	...	140	11	36	21	243	382	122	5	56	...	45	...	139	...	41	...
..	820	556	23	10	14	4	211	186	220	300	740	1516	321	83	225	122	1035	482	183	17	27	...
..	14	7	...	...	...	...	5	2	15	49	31	178	...	...	2	...	5	...	16	...	98	...
..	261	206	15	22	12	8	134	64	105	195	332	748	122	16	230	10	...	...	4	...	19	5
..	129	35	7	...	6	...	18	5	196	109	1656	1533	291	45	360	66	360	33	122	6	51	10
5	486	396	21	...	29	12	128	19	181	281	965	2467	794	20	7374	5	149	...	2233	11	1434	18
..	130	117	2	...	7	...	69	31	60	284	317	943	231	28	318	30	64	146	148	6	26	...
..	3	18	...	...	...	...	6	...	12	52	115	206	18	...	5	7	...	...	10	...	18	...
..	94	58	9	2	6	7	36	41	57	225	254	354	549	122	956	4	94	37	782	6	701	...
..	217	82	5	...	10	...	85	32	66	20	732	797	175	10	577	6	8	...	141	...	33	11
..	24	5	...	...	7	...	26	...	18	28	577	617	158	...	55	...	12	...	35	...	13	6
..	120	12	...	...	...	...	34	5	58	59	387	547	143	15	15	23	5	...	55	5	35	...
..	103	62	...	...	...	...	32	2	44	15	312	212	98	...	28	22	33	...	...	...	2	5
..	507	171	...	...	...	...	18	15	163	90	1680	1955	91	5	182	...	...	...	27	...	12	...
..	21	...	6	...	...	...	9	...	5	...	29	18	10	...	28	...	48	7	8	...	5	...
..	181	54	16	5	15	...	175	20	73	118	1016	1341	216	31	87	...	27	5	1151	26	710	35

VE HOURS DURING THE FISCAL YEAR ENDING JUNE 30, 1913.

Railroads reporting fewer than 25 instances in the aggregate of all classes of excess service are not shown.

N Hours.

30 to 31		31 to 32		32 to 33		33 to 34		34 to 35		35 to 36		36 to 37		37 to 40		40 to 45		45 to 55		55 to 65		65 or more		Totals	
20	..	..	8	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2800	432
..	5	..	..	..	..	5	..	3	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	489	176
44	2	26	3	5	..	2	..	..	..	8	..	2	5	5	..	..	..	15	..	..	..	..	..	19816	2748
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	940	554
..	..	10	..	..	..	..	..	..	..	..	..	..	..	5	..	..	..	..	..	..	..	..	..	4049	691
..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	608	153
..	..	5	..	..	..	..	..	4	..	..	..	3	..	4	..	..	..	..	..	2	..	5	..	3808	1029
9	..	5	..	13	4	14	..	2	..	..	..	5	..	4	5	6	6	2	6	2	6	5	..	3939	1665
..	..	..	..	..	..	..	..	..	1	..	..	..	..	2	..	..	..	..	..	..	..	..	..	1223	920
5	..	..	..	..	..	..	..	..	..	..	..	..	..	5	..	..	..	..	..	..	..	..	..	2215	337
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	691	133
7	..	..	..	5	..	..	..	..	..	..	..	3	..	2	..	10	..	21	..	..	..	3	..	4473	959
..	..	..	..	4	..	3	..	..	..	..	..	1	..	8	..	1	..	7	5	..	2	..	..	2234	689
10	2	9	..	18	1	28	..	..	2	5	..	..	..	..	..	..	..	..	..	..	..	..	..	14316	4847
..	..	2	..	8	..	2	..	..	..	..	..	3	..	..	..	..	..	..	..	..	..	..	..	1169	186
7	..	5	..	3	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1311	95
..	..	11	..	7	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4703	1130
..	..	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	846	217
5	..	..	..	5	..	1	..	..	..	1	4	..	..	..	..	..	..	5	..	..	..	..	..	896	239
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1472	416
7	..	12	3	4	6	..	..	..	..	3	..	2	..	3	..	..	..	..	..	..	..	..	..	14307	1963
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	381	226
..	..	..	..	..	..	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4856	334
9	8	8	2	13	..	1	..	15	..	..	..	8	..	15	..	2	..	5	..	..	5	..	..	5175	1665
35	5	38	4	15	..	8	..	24	..	12	..	..	..	16	..	12	..	..	..	..	..	5	..	19073	2018
10	..	3	..	7	..	9	..	6	..	5	..	..	..	6	..	..	2	..	..	..	..	..	..	4059	544
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	557	115
19	..	14	..	13	..	13	..	11	..	5	..	18	..	15	..	8	..	7	..	6	..	30	..	4633	666
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3069	1273
..	..	..	..	..	..	..	..	..	..	..	..	3	..	..	..	..	..	..	..	..	..	..	..	1589	470
15	4	5	..	..	7	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1555	341
..	..	..	..	6	..	1	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1265	177
3	..	4	..	5	..	..	..	5	..	10	..	..	..	13	..	5	..	..	..	..	..	..	..	5501	771
..	..	2	..	..	..	..	..	..	..	..	..	8	..	11	..	..	..	..	..	..	..	..	..	169	70
..	..	3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	6849	2962

NT TO TABLE I.

re respectively employed. The instances in heavy figures refer to causes of delays immediately affecting other trains the *latest* delay, but for the occurrence of which the given run might have been completed within the statutory

tation work, waiting orders, and eeting trains		Tele-graph troubles		Air brake troubles		Hot boxes		Coupler and drawbar defects		Miscella-neous car defects		Sickness, death, and personal injury		Miscella-neous causes not otherwise specified		Totals		Com-bined totals
16	10	6	...	43	43	62	17	348	67	250	168	18	...	65	5	2158	1074	3232
5	...	5	...	11	...	8	...	65	5	20	7	5	...	26	5	336	329	665
37	40	97	10	302	85	144	22	2674	2192	770	1282	68	5	949	164	12643	9921	22564
02	13	...	...	2	...	4	...	36	19	37	25	3	...	210	16	1069	425	1494
35	36	25	...	190	42	20	10	1154	306	207	209	5	...	100	15	3037	1703	4740
18	5	...	...	22	...	...	...	50	13	50	36	1	...	63	...	559	202	761
10	5	7	...	126	38	217	5	1179	456	370	148	23	...	112	29	3463	1374	4837
31	11	16	...	97	10	43	2	543	74	203	52	16	2	578	10	4044	1560	5604
9	...	...	...	27	...	29	9	111	43	109	35	6	...	265	6	1446	697	2143
..	...	10	...	65	25	15	...	112	40	258	241	4	...	38	3	1392	1160	2552
3	...	2	...	8	9	1	2	25	13	37	69	4	...	...	...	299	525	824
9	...	23	...	241	109	59	...	811	336	372	239	27	...	328	23	3329	2103	5432
91	...	...	...	62	3	19	...	136	97	191	27	14	5	218	5	2184	739	2923
58	30	129	10	395	112	167	46	2155	514	564	353	67	...	1513	139	13993	5170	19163
..	...	151	...	28	12	17	6	82	84	37	136	...	...	16	...	777	578	1355
..	...	...	...	...	...	...	...	...	25	19	29	...	...	25	...	577	829	1406
58	...	117	...	32	12	79	...	428	227	256	233	28	...	434	13	3548	2285	5833
5	...	5	...	65	16	20	...	128	36	121	70	1	...	20	5	657	406	1063
11	...	...	...	5	...	...	...	80	36	69	17	...	...	55	5	685	450	1135
41	...	15	...	35	...	7	...	132	21	70	24	13	...	130	5	1391	497	1888
27	...	20	...	723	325	623	152	2712	1926	852	1223	101	30	436	51	9287	6983	16270
98	...	...	...	...	...	...	...	10	...	5	12	...	...	158	...	359	248	607
19	5	59	...	181	107	22	23	938	497	166	354	21	...	229	85	2850	2340	5190
51	10	43	...	110	21	113	9	437	82	269	51	9	...	601	16	4814	2026	6840
34	18	266	5	91	46	160	9	605	588	291	412	29	...	1046	68	16687	4404	21091
26	...	...	...	106	236	7	32	268	354	143	269	19	...	195	12	2115	2488	4603
18	...	...	...	3	...	...	...	...	...	24	115	...	...	60	...	274	398	672
01	...	48	...	32	2	43	7	137	138	52	81	11	...	278	29	4186	1113	5299
33	11	20	...	54	...	71	...	297	97	182	68	9	...	421	55	3164	1178	4342
13	6	12	...	31	17	6	6	61	4	115	37	6	...	160	5	1330	729	2059
35	...	23	...	5	...	17	4	54	20	96	55	3	...	64	17	1134	762	1896
2	5	...	...	9	5	...	...	244	41	128	2	...	...	40	...	1076	366	1442
12	...	164	...	91	5	...	...	660	67	180	109	24	...	46	...	3855	2417	6272
5	...	...	...	5	...	2	...	28	2	5	...	...	...	3	...	212	27	239
10	35	60	...	125	12	613	52	593	189	234	86	69	5	1608	119	7672	2139	9811

EXCESSIVE HOURS WORKED BY TRAINMEN AND TELEGRAPHERS

(WITH AN INSET.)

As was noted in its annual report, summarized in the *Railway Age Gazette* of December 26, page 1228, the Interstate Commerce Commission has tabulated the information furnished to it by the railways of the country under the hours-of-service law and has found that in the last fiscal year there were 301,743 cases in which men were on duty for longer periods than those specified in the law—each item, presumably, referring to one person. These tables fill a pamphlet of 16 large pages, details being given for each of the 250 roads which have reported 25 or more cases as occurring in the 12 months.

To show the nature of the information given in this bulletin we have prepared (and show on the inset given herewith) two tables, similar to Tables I and II, in which are given the figures from the reports of all the roads (35 of them) on which the revenue train mileage is more than ten million miles a year. These larger roads were picked out from the 250 because of the impracticability of reprinting the whole bulletin.

Table I refers to instances in which employees in train service were on duty for longer periods than 16 consecutive hours. The roman figures in this table refer to instances of excess service attributed by the carriers to causes arising before the expiration of 14 hours from the commencement of the various periods of service; while the heavier figures indicate those instances attributable to delays occurring subsequent to such period of 14 hours.

Table II shows in detail the apportionment of the foregoing instances of excess service to each of the designated causes of delay. The roman figures in this table, exclusive of combined totals, refer to instances of excess service attributed by the carriers to causes of delays immediately affecting the trains on which the men involved were respectively employed, the item shown in heavier figures referring to such instances attributable to delays immediately affecting other trains in relation with which such trains were running at the time. "The reasons suggested by the carriers themselves, wherever practicable, have been accepted as the primary cause of excess service." Where several independent causes of delay have been reported as responsible for a single instance of excess service, the initial cause disclosed by the report in question as responsible for the latest delay, but for the occurrence of which the given run might have been completed within the statutory period, has been considered as the primary cause of such excess service.

For the purpose of comparing volume of traffic with the number of offenses or alleged offenses under the hours-of-service law, the classification of the roads according to train mileage is obviously fairer than to classify by mileage of road. No accurate comparison can be made, however, as train mileage for 1913 has not yet been reported. The names here shown have been selected on the basis of the train mileage given in the report for the year ending June 30, 1912. The roads, with the volume of their traffic, in *thousands* of revenue train miles, for the year referred to, are as follows:

Pennsylvania	58,388	St. Louis & San Francisco	19,986
N. Y. Central & H. R.	48,051	L. S. & Mich. Southern	18,907
Baltimore & Ohio	38,252	Penn. Lines West of Pitts. (P. C. C. & St. L.)	18,769
Chic. Mil. & St. Paul	38,209	Union Pacific	18,136
Chic. & North Western	36,892	Atlantic Coast Line	16,789
Chic. Burl. & Quincy	34,977	Wabash	16,191
Atchison, T. & Santa Fe	34,904	Philadelphia & Reading	16,167
Southern	33,658	Norfolk & Western	15,685
Chic. R. I. & Pacific	33,543	C. C. C. & St. L.	15,593
Illinois Central	31,093	Chesapeake & Ohio	13,805
Southern Pacific	30,001	Missouri Pacific	13,804
Louisville & Nashville	28,112	Michigan Central	13,292
N. Y. New Haven & H.	24,360	Lehigh Valley	13,271
Erie	23,016	St. Louis, Iron Mtn. & So.	12,446
Penn. Lines West of Pitts. (Penn. Co.)	22,767	Delaware, L. & W.	12,134
Great Northern	21,979	Minn. St. Paul & S. S. M.	11,722
Boston & Maine	21,370	Seaboard Air Line	11,332
Northern Pacific	21,270		

In the statistical report of the Commission, from which these figures are taken, the roads are arranged, by districts, in the order of the magnitude of their business, and they are here shown in that order. It is to be borne in mind that train mileage, though the best basis on which to make comparisons, is not in all respects satisfactory. For example, the Erie road has a train mileage not very much greater than that of the Boston & Maine, but its revenue ton mileage is much more than double that of the Boston & Maine, indicating longer and heavier trains. Another striking difference in conditions is observable in a comparison between the Boston & Maine and the Northern Pacific. The revenue train mileage of these two roads is nearly the same, but the Northern Pacific's mileage of road is nearly three times as great as that of the Boston & Maine.

In addition to the information given in Tables I and II the bulletin contains a third table devoted to telegraph operators and to employees in train service, other than those shown in Tables I and II, who continued on duty after an aggregate service of 16 hours. This table, which covers 6,337 cases, takes in those instances in which the aggregate service performed by a trainman may include two or more intermittent periods, while in Tables I and II every item refers to a period of continuous service.

Table III shows also 878 cases of returning to duty after 16 hours continuous service without having had 10 consecutive hours off duty; and 274 cases of returning to duty after an aggregate service of 16 hours without having had 8 consecutive hours off duty.

Of telegraphers working overtime Table III records 31,132 cases. Of those on duty more than nine hours, in offices continuously operated day and night, 881 worked more than nine hours and not more than 10; 1,593 worked more than 10 hours and not more than 11; 1,738 more than 11 hours and not more than 12, and 20,421 worked more than 12 hours and not more than 13. There are 45 cases where men worked more than 20 hours. Of cases of men on duty more than 13 hours in day offices, 1,337 worked more than 13 hours and not more than 14; 1,094 more than 14 hours and not more than 15, and so on, the total number of cases at the day offices being 4,544. There are in this list 245 cases where the time on duty was more than 20 hours, including 73 cases where it was more than 24 hours.

ELECTRIC TRACTOR FOR HANDLING FREIGHT CARS OVER TRACKS ON CITY STREETS*

For many years the practice has obtained in certain large cities of operating freight cars over tracks laid on city streets, thus providing for the reception of freight at industrial establishments remotely located as regards main railroad track or sidings. It has been the practice since the inception of this work to use horses as motive power. Various schemes have been suggested for using other motive power, as it is acknowledged that the use of horses is not in keeping with modern methods of transportation and the franchises are too valuable to abandon notwithstanding the constantly increasing cost of operation by horses. Many projects have been suggested using electric locomotives, but this solution is not only expensive, but does not satisfactorily solve the problem.

The writer was called in on the problem in the summer of 1911. It was thought that the best procedure was to submit the problem to the manufacturers of the heaviest and most powerful motor trucks and use the design that most nearly met with the requirements, making such modifications as would be necessary to conform to the special service. Several of the more conservative builders at once advised that their largest trucks were not suitable for the work, but some others were equally satisfied of the ability of their trucks to do the work. Four of these arranged through their agents for demonstration, and trial was made of the different makes. Any of these trucks would pull a 50-ton loaded car on level, but all experienced trouble in starting and none were able to pull a loaded car on 50 ft. radius or on 2 per cent. grade.

Further preliminary study developed the following features

*Abstract of a copyrighted paper on "The Development of an Electric Tractor for Handling Freight Cars Over Tracks Laid on City Streets" presented by T. V. Buckwalter before the Society of Automobile Engineers on January 6, 1914.

which should find a place in the projected machine: The necessity of immense drawbar pull required traction on all wheels. Simplicity of construction and control limited the design to four wheels. Convenience of operation required that these four wheels be controlled by steering levers. "Safety first" compelled braking of all four wheels.

A general design was adopted in April, 1912, and work commenced on detail drawings. The work was pushed rapidly and work started in the shops immediately upon completion of detail drawings with the result that the machine was completed before January, 1913.

Results of Operation.—It was expected that many troubles and evidences of weakness or defective design would develop immediately upon inauguration of the tractor in active service; in fact such terms as "white elephant," etc., were beginning to be heard before the machine was assembled. As a matter of fact, notwithstanding it was the first machine of its type and therefore, precedents and previous experience were not available, but few failures have been experiencd.

The tractor was shipped from Altoona January 4, 1913, and was unloaded at the express yard, Jersey City, January 14. After the selection of a chauffeur, practice service within the limited confines of the yard was maintained until February 4, when the machine was placed in regular service. The average daily service by months is shown on the following table:

Average Daily Performance of Electric Tractor by Months

Month 1913	Hours on charge	Hours in service	Discharge in ampere hours	Miles run	No. of cars handled In	No. of cars handled Out	Total	Total weight, tons	Number of interni. movements	Days in service	Days out of service
February	8.2	8.5	616	12.1	14.8	14.8	29.6	992	19.5	..	..
March...	7.3	8.5	508	12.6	15.3	15.0	30.3	1,032	19.4	..	..
April....	7.9	9.5	518	13.7	15.7	16.5	32.2	1,100	20.9	..	..
May.....	7.27	8.45	510	14.8	17.	17.	34.1	1,118	17.3	..	..
June.....	6.7	8.6	494	13.1	15.7	15.9	31.6	1,057	14.	..	..
July.....	6.	7.7	410	14.4	14.4	14.4	28.7	962	13.6	..	..
August..	5.5	6.7	344	10.3	11.4	11.4	22.8	763	14.3	..	..
Avg...	6.98	8.28	486	13.0	14.9	15.0	29.9	1,003	17.0	..	..
Totals by Months.											
February	164	168	12,120	241.5	297	296	593	19,842	390	20	..
March...	190	220	13,230	328.3	398	390	788	26,837	504	26	..
April....	166	199	10,890	280.9	330	346	676	23,082	438	21	5
May.....	160	186	11,225	325.	375	375	750	24,600	380	22	4
June.....	167	215	12,330	327.9	393	397	790	26,433	351	25	..
July.....	156	199	10,430	303.7	374	373	747	25,005	354	26	..
August..	144	174	8,940	268.7	296	295	591	19,775	371	26	..
Total for 7 mos..	1,147	1,361	79,165	2,076.	2,463	2,472	4,935	165,574	2,788	166	9

Cost of Maintenance and Operation.

Month.	Repairs.	Supplies.	Lubrication.	Chauffeur Labor.	Current.	Total.
February	11.78	2.02	1.13	139.10	91.38	295.45
March	100.82	6.40	1.18	105.18	94.45	308.03
April	183.86	13.38	1.55	125.89	92.19	416.87
May	548.38	3.67	1.58	141.52	122.05	817.20
June	894.94	9.43	1.12	140.88	73.97	1,120.34
July	59.36	2.59	8.10	146.09	103.39	319.53
August	16.71	5.01	2.82	161.85	96.40	282.79
Total for 7 mos.	1,815.85	42.50	17.48	960.55	673.83	3,510.21

Cost of maintenance and operation 7 months		$3,510.21
Interest at 6 per cent. on $13,400—7 months		476.00
Depreciation on $13,400 (less tires and battery 4,200 = 9,200) @ 5 per cent.—7 months		268.33
Depreciation on battery, $3,200 @ 20 per cent. for 7 months		373.34
Total charges for 7 months		$4,627.88
Total charges if horses had been used (4,935 cars x $1.86)		9,179.10
Saving by electric tractor—7 months		$4,551.22
Saving over investment by electric tractor	58.5 per cent.	
Saving including investment 58.5 + 6 per cent.	64.5 per cent.	
Cost of service per car ($4,627.88 ÷ 4,935)		.938
Cost of service per ton ($4,627.88 ÷ 165,524)		.028
Average number of cars per mile		2.4
Cost of service per ton mile (.028 x 2.4)		.067
Total number of cars handled (4,935 + 2,788)		7,723.
Number tons handled per hour		121.
Cost of service by electric tractor per working day		$27.87
Cost of service by team per working day		$55.29

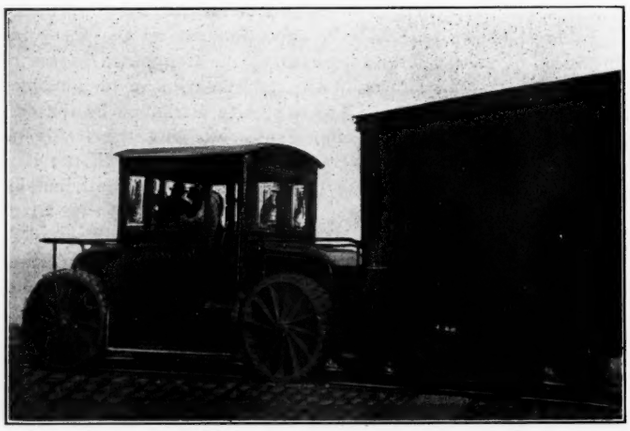
The tables indicate that the machine has handled a total of 4,935 cars in the seven months, from February to August, inclusive, at a cost of $4,627.88 including all capital, maintenance and operating charges. The cost of handling this number of cars by horses would have been $9,179.10, thus indicating a saving by use of the electric tractor of $4,551.22, or 64.5 per cent. on the investment of $13,400.

It will be noted that the cost of operation is regular at from $300 to $400 per month, except the months of May and June, when the repair charges are considerably higher. This is due to the replacement of the original tires and steering knuckles, which was done in April and the first four days in May.

Tire Expense.—The original design contemplated the use of continuous tires, but it was found that the cost of these would be excessive, as would also the cost of replacements in case of minor accidents to tires. A tire was therefore designed embodying the use of blocks 6 in. x 14 in. in size, arranged 24 to a wheel in two rows of 12 each. The tread is vulcanized to a steel base through the medium of a layer of hard rubber. Each steel base is secured to the wheel by four ¾ in. studs.

It was thought that each block should be divided into three sections to obtain better traction; this was attained, but at the expense of load sustaining capacity. The tire contract was placed with a firm which had been quite successful in making small truck tires. The tires showed signs of weakness during the first months for two reasons. First, on account of the use of too much pure rubber, which had the effect of reducing the sustaining power. Second, a similar effect from use of sectional tread.

The design was therefore changed to utilize a single tread to each block, and equipment for a complete wheel was obtained, one from each of two standard tire manufacturers. The other two wheels were equipped with block tires designed by the tire maker, one wheel being assigned to each of two makers. As



Electric Tractor Hauling Pennsylvania Box Car

each wheel carries an equal weight and does an equal amount of work, an exceptionally fair test is under way. The replacement of tires commenced early in April and was completed May 5. Pending the receipt of new equipment the machine operated a couple of weeks on tires made by winding 7 in. circumference rope over the rim of the wheel. All of the new tires are giving good results and the experience thus far obtained leads us to expect one and one-half to two years' service per set.

Steering Knuckle Failure.—The original steering knuckles failed on account of being burnt in heat treatment, due to misunderstanding between the day and night forces. A loss of service of nine days was entailed in replacing the burnt knuckles. This was accomplished on May 5, and since that time no service has been lost and the failures have been confined to minor items such as breakage of air hose, lamps, etc. Omitting the cost of the above-mentioned replacements the saving on the investment would be over 80 per cent.

Speedometer.—A speedometer equipment was not originally intended as part of the equipment, but the desirability of information on tires, etc., made it practically a necessity. Due to the peculiarities of the automobile industry, it was found cheaper to provide a combined speedometer and odometer than the odometer alone. An instrument calculated for slow speed vehicles was also not obtainable, but an instrument reading to 80 miles an hour was geared up ten to one, thus providing accurate readings to 8 miles per hour.

General News Department

The New York, New Haven & Hartford has ordered a reduction of 10 per cent. in the pay of several hundred machinists, boilermakers and other shop men.

The train robber who murdered H. E. Montague, a passenger agent, on a train of the Southern Pacific, near Los Angeles, December 1, has pleaded guilty in court and has been sentenced to death. The robber's real name is Fariss, and he is said to be the son of a respectable employee of the Southern Pacific.

The attorney for the Ohio Public Utilities Commission has brought suit in court against the Newburg & South Shore for violation of the full crew law of Ohio. This law prescribes the number of men to be provided not only on the road, but also on trains operating in yards—one engineman, one fireman, one conductor and two brakemen.

The New York, New Haven & Hartford and the Boston & Maine have announced that the earnings of individual passenger trains are being investigated in detail, and that where trains are found to be unprofitable they may be taken off. The New Haven announces that the trackage rights under which it runs passenger trains over certain sections of the Boston & Albany, will be terminated January 31, in accordance with the views of the attorney general at Washington.

The Pennsylvania Railroad has contracted for the power for the electrification of its lines between Broad street station, Philadelphia, and Paoli, and between Broad street station and Chestnut Hill, about 30 miles of line, with the Philadelphia Electric Company. It is expected that probably all of the local trains on these lines will be run by electric power before the end of 1914. The contract is for five years. At the beginning the trains will require about 4,500 h. p. The contract calls for a minimum of 3,750 kilowatts.

The Union Pacific has abolished the title of assistant general manager held by the heads of departments on the general manager's staff under the Hine system of organization, retaining the distinctive titles of superintendent of motive power and machinery, chief engineer, superintendent of transportation, etc. Under the statutes it is necessary to have a distinctive title for some departments. Heretofore the road has used both titles and only the one legally required is to be retained. There will be no change in work or responsibilities.

A whole mountain of earth is being sent East from California over the Southern Pacific. It is situated near Lompoc, but the state of Pennsylvania wants it and is willing to pay the price for it, so that it is being shipped a matter of 3,000 miles by rail at the rate of 15 cars, or 750 tons, a month. When the last car has gone out an accurate indication will be had of what a mountain actually weighs. The earth is of a very peculiar consistency, and is supposed to be the result of gradual decomposition for ages past of millions of sea shells. For commercial use, the only process it goes through is grinding. It is sold in the east as infusorial earth, and has high value for insulating purposes in the electrical industry.

On Wednesday Daniel Willard, president of the Baltimore & Ohio, and other representatives of the trunk lines, appeared before the Interstate Commerce Commission to ask for as much expedition in the rate advance cases as the commission considered consistent with thorough investigation, and to explain to the commission that it would be quite impossible to answer all of the questions (abstracted elsewhere in this issue) which the commission has sent out before January 31. In the afternoon Commissioner Harlan held a conference with G. S. Patterson, of the Pennsylvania; O. E. Butterfield, of the New York Central; H. L. Bond, of the Baltimore & Ohio, and Louis Brandeis, and certain modifications were made in the questions. At Mr. Brandeis' suggestion the answer to the question which involved the lighterage charges at New York City with the New York Central was cut down in point of time from a year to a month. Instead of submitting copies of all of the contracts involving the purchase of material, the Baltimore & Ohio was permitted to submit only such as were called for by the commission.

The Telephone Voice

The "campaign of politeness" on the Southern Pacific includes little placards attached to the telephone stands in the offices of the company. These "reminders" convey the following advice: "When you answer the telephone, be pleasant. It costs you nothing and in your heart you want to be liked. As you take off the receiver, say, 'Southern Pacific,' and then give your name or department. It saves time. Said pleasantly, it is a good advertisement for yourself and the company. Thank the man who helps you or gives you information—he likes it. Remember, on the telephone, the voice is everything. See that it is friendly."

Mr. Willard's New Year's Message

President Daniel Willard of the Baltimore & Ohio, on December 31 prepared his usual annual message of greeting to the employees of the company; and at 12:01 on the morning of the first of January, he had it sent by telegraph to every office on the company's lines—about 1,200 offices. The operators had been notified to be on hand to receive the message, and transmission of the whole, 337 words, on all circuits, was finished at 12:27 a. m. At the several stations a sufficient number of copies were made so that early on Thursday morning the message had been put into the hands of every employee, including not only the train and station forces, clerks and shop men, but also the track repairers and everybody.

In his message President Willard referred to the results of the company's operations during 1913, touching upon the heavy losses by reason of the spring floods in the Central West, also commenting upon the condition of business and the outlook for the coming year. He likewise emphasized the policy of the company as to "Safety-First." He said in part:

"Once more I wish to extend to all employees my best wishes for a happy and prosperous New Year. . . . I assure all of my appreciation of their loyal service and support. . . . It is to be regretted that the smaller volume of business at present has made it necessary to reduce the force. It is hoped that conditions will soon mend. . . . While the most rigorous economy is necessary, it should be clearly understood that nothing is to be done which will in the slightest degree adversely affect the safety of operation. . . ."

"New Year Thoughts"

[J. O. Fagan, in the Boston Herald.]

In the railroad world today the distinctive call of the New Year is for creators of confidence. Today on our railroads we are listening to the final flickerings and explosions of our antiquated and once popular standards of railroad morality. They are healthy and significant indications. They indicate unmistakably that the railroad business today from top to bottom is being rapidly impregnated with increasingly higher conceptions of corporate and private honesty. In the nature of the situation, however, a confidence movement in the interest of the railroad is absolutely dependent for success upon the friendly co-operation of its state and national regulators. Looking backwards, credit must freely be given to the interstate commerce commission for a remarkably effective commercial and industrial clean up; but nevertheless we are driven to the conclusion that the work of the commission in relation to the interests of the industry as a whole, has been rather discouraging. The commission has almost invariably behaved as if it considered the interests of the railroad itself to be subordinate to each and every one of its associated problems. While specific departments have been very much benefited by federal supervision their co-operative relationship to the railroad itself has been undermined and

a hodge podge situation has resulted. Mismanagement in the past is no excuse for this mistaken policy on the part of the commission.

Happily, there is light on the horizon. Commissioner Meyer, for example, has recently said that "it is more important that justice shall be achieved in a large way than that some specific standard shall be promulgated and adhered to under all circumstances." The public and private regulators of the railroads today are on a railroad horseback. At the head of the animal they are leveling all manner of corrective advice and paternal encouragement, while at the same time they are vigorously belaboring his other end with a knotted stick. The bewildered railroad horse though willing enough to be guided doesn't know what to make of it. As a confidence proposition the situation is ridiculous. Confidence in railroad enterprise and administration all over the country awaits saner and fairer treatment.

Baltimore & Ohio Safety Committee

The Baltimore & Ohio has reorganized its "safety-first" work and has established a general safety committee of seven members who are to give their whole time to this work. The chairman is J. G. Pangborn and the other members are E. R. Scoville, John Hair, W. M. Bond, J. P. Campbell, Dr. E. M. Barlett and B. C. Craig. The three men who have been managing the safety-first work during the past three years, Messrs. Boyd, Coon and Tearney, are now an advisory committee. The new general committee will visit each division of the road on one day each month, to confer with local committeemen and to inspect the property. Major Pangborn is the well-known historian and former traffic officer of the Baltimore & Ohio. Mr. Scoville was for 12 years a division superintendent west of the Ohio river. Mr. Hair has been in the mechanical department since 1897 as master mechanic and superintendent of motive power. Mr. Bond was formerly a division engineer, Mr. Campbell a station agent and Dr. Barlett in the relief department. Mr. Craig for the past nine years has been inspector of safety appliances in the employ of the Interstate Commerce Commission.

Poor Financial Report of Italian Railways

The Italian State Railway System, but 9,000 miles long, comprises nearly the entire railway mileage of the Italian peninsula. In April, 1911, the Italian government advanced rates on passenger traffic from 6 to 9 per cent. and added 2¼ centimes (or about ½ cent) a ton to the rates on freight shipments. The return for the fiscal year 1911, just issued, indicates clearly the great need of these changes. During the year there was a gain of over 4,000,000 passengers carried and a resulting increase in passenger revenue of about $2,000,000. There was also a 2,000,000-ton gain in freight carried, which advanced the freight revenue almost $4,000,000. The total receipts rose from $103,300,000 to $109,375,000, but there was an increase in operating expenses of almost $7,000,000 to $92,300,000. This meant a decrease in net income of more than $500,000. The operating ratio became 84.39 per cent. as compared to 82.90 per cent. in the preceding fiscal year. The net profits before the payment of charges on capital have thus amounted to but 1.51 per cent. on the capitalization, whereas the government debt paid from 3 to 4½ per cent. It is said that advanced wages play the greatest part in the increasing expense. It is hoped that 1912 will make a better showing.

The Signs of the Zodiac; Modern Version

Judge William R. Smith, of Topeka, formerly of the Kansas Supreme Court bench, now the attorney for the Atchison, Topeka & Santa Fe in Kansas, recently wrote a letter describing the present position of the railroad president, as follows:

"While consulting my family almanac to learn whether a dry day had been selected for our next prohibition picnic I ran across the picture of a man on the front page who was surrounded by the twelve signs of the zodiac. His serious condition suggested the attitude of a railway president of today. Apparently composed, he stands naked without sword or shield in the midst of ferocious beasts and stinging reptiles. At the left of the picture two milk-fed twins embrace each other, representing in their seeming innocence a partnership of middlemen rejoicing over a decrease in freight rates which the consumer after persistent effort has secured, but of which this heavenly pair are the only beneficiaries. Below these public benefactors a couchant lion lashes his tail, ready to spring should the president stretch out his right hand and adjust the scales within his reach so that they may balance equally between carrier and shipper.

"We next see the archer, typical of the legislator of commerce, with bended bow and arrow aimed straight at the bare leg of the defenceless man. Though vicious in aspect, his assaults may be tempered with moderation if sufficient inducements are held out. Two thirsty fish, gasping for breath, appear in the collection, awaiting a flood of watered stock, of which there are no signs. The rampant goat, the scorpion, the crab and the bull are all vigilant lest the man they are watching should do something to prejudice the particular interests they have in charge.

"With this incongruous aggregation, the zodiac man, like the railway officer, must be at peace.

"To prevent any possible escape he has been sorely wounded, having a trap door in his abdomen exposing its convolutions to the gaze of the public and the Interstate Commerce Commission.

"With this bodily affliction added to the bellowing of the bull, the roar of the lion and the hissing of serpents, the man does not flinch or murmur. . . ."

Some Eggs Well Packed

Claims arising from damages to egg shipments will range from 3 to 33 per cent. of the revenue thereon, depending upon methods of packing, handling and inspection. That it is possible to eliminate such loss by improved methods of packing at no greater but at less cost for egg carriers was recently demonstrated by the arrival in Pittsburgh of a consignment of eggs from Russia without a single cracked or broken egg. This shipment consisted of 50 cases, 6,000 dozen, originating at Warsaw, carried by boat 1,400 miles to Labava, thence 1,500 miles by rail to Rotterdam, about 3,000 miles across the Atlantic to New York, and 500 miles by rail to Pittsburgh. A distance of approximately 6,400 miles was traveled and the eggs were drayed on a number of occasions; transferred from boat to rail and vice versa. The cases were stood on ends and, with chains wrapped around three or four cases in a bunch they were lowered into the hold of the vessel and, in general, subjected to much rougher handling than is necessary in our intrastate or interstate transportation.

The cases in which these eggs were packed were 5 ft. 10½ in. long, 22 in. wide and 9½ in. deep, made of pine. The ends

were ⅞ in. thick, and the top, sides and bottom ½ in., the strips being 6 in. wide. In packing the eggs the case is laid flat and the packer takes shavings and makes a cushion, which when packed close is about 1 in. thick. On this cushion he places the eggs 18 in a row, 10 rows; or a total of 180 eggs, or 15 dozen in each compartment layer. He then places another cushion of shavings of the same thickness on top of this, and then another layer of eggs, repeating the process until the filled case contains four layers. The case and shavings can be provided more cheaply than four of our standard cases with fillers of combined equal capacity.

This method of packing was demonstrated in the Wabash building, Pittsburgh, a few days ago in the presence of a number of railroad officers and shippers. Only one objection has been raised by the egg dealers, and that is to the size of the case. It is thought that a case of half the length will meet the objection and be equally efficient. A thorough experiment will be undertaken to determine this.

In the illustration the right hand part of the box has in it but one layer of eggs.

Frisco Telegraphers' Strike Averted

The threatened strike of the telegraph operators on the St. Louis & San Francisco was averted by a compromise agreement reached between representatives of the operators and the receivers of the road, following conferences on December 29 and 30, after the officers of the road had suspended about 300 telegraph operators and replaced them with telephone operators. The agreement provides for the restoration of some of the telegraph lines and the return to service of the suspended men as fast as places can be found for them. Instead of a 15 per cent. advance in wages the men will receive about 6 per cent. Overtime is to be paid for at the rate of 35 cents an hour, instead of 25 cents, as before, and at stations where only one man is employed, working hours are reduced to ten hours a day.

One of the most serious points of conflict in the negotiations was the demand of the Order of Railway Telegraphers that station agents who do not perform telegraph duties, and who have not been included in agreements with the operators heretofore, be included in the schedule, and that all agents be appointed from the ranks of telegraph operators. This demand the receivers refused to entertain, for the reason that the Frisco has developed a plan of organization whereby station agents are given more authority than is usually the case to represent the road in their localities.

Receiver W. C. Nixon, in a statement, explains the position of the company on this point in part as follows:

"The people in communities whose dealings with the railroad are so small, as compared with others, that they do not have the opportunity to come in contact with the higher officials, except in rare cases, by accident, should have the same facility to come in contact with officials of the railroad who have the authority to meet their necessities as the comparatively few, now favored by reason of their location and other facilities, to come in contact with a direct representative of the company who is able to do for them the things that are so very necessary as between any business institution and its customers. The public must necessarily form an opinion of a railroad by its experience received in contact with the railroad representatives.

"The selection of men to represent a railroad should not be left to chance, but as it is so very important that the officers of the railroad are entitled to govern in the selection of men to fill these positions, and their success and the success of the management of the whole railroad will be great or small as is the judgment and wisdom used in selecting for their representatives in all branches of the service, the men who will represent the railroad in a manner to best serve the necessities of the customers of the railroad, and who will be able, by reason of having special fitness, to make the railroad they represent popular with its customers, instead of the contrary.

"This is a matter which absolutely calls for the selection of the best men available among our employees to occupy these positions on railroads, and the railroad should never cease trying to bring about this condition, much less should the officers agree to a position where they are not left free to use their own judgment in these matters, because this is really the keynote of the whole situation; and as the managers of railroads are successful, or not, in this matter, the prosperity of the company is great or proves to be a failure.

"The art of telegraphing in no particular has anything to do with these qualifications. One who fills this position is not required to perform any telegraph duties whatever. The man who is especially active and has the natural ability to meet the requirements named above always distinguishes himself and attracts attention, both from the communities which the railroad serves and from the railroad whose employ he is in.

"As far as the seniority matter is concerned: these positions, if the employees are equal in ability, will naturally go to the man who is longest in the service, because he has had the opportunity, because of his length of service, to do more things and to attract the attention of the officials more favorably by doing more things commendably than the man who has been in the service a lesser length of time.

"The railroad cannot be fully successful unless it gives an opportunity to every man in its service for promotion, based on demonstration of ability to fill the requirements of a position, whether that employee be in one line of the service or another."

Western Society of Engineers

The following officers have been elected for the ensuing year: President, E. H. Lee, chief engineer Chicago & Western Indiana, Chicago; first vice-president, B. E. Grant, division engineer, board of local improvements, Chicago; second vice-president, Ernest McCullough, consulting engineer Chicago; third vice-president G. F. Gebhardt, professor mechanical engineering, Armour Institute Technology, Chicago; treasurer, C. R. Dart, bridge engineer, sanitary district, Chicago; (re-elected) trustee for three years, H. S. Baker, assistant city engineer. The annual meeting and dinner was held at the Hotel La Salle, Chicago, on January 7. Dr. Mortimer E. Cooley addressed the meeting on "The Relation of the Public and the Public Service."

Western Railway Club.

At the next meeting of the Western Railway Club on January 20, there will be an address by C. W. Demarest, superintendent of motive power of the Pennsylvania Lines. He will speak on the general subject of car maintenance and its relation to interchange, but the exact title of the paper has not yet been announced.

MEETINGS AND CONVENTIONS

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass. Next convention, May, 1914.

AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—A. G. Thomason, Boston, Mass. Convention, May 19, 1914, St. Louis.

AMERICAN ASSOCIATION OF GENERAL PASSENGER AND TICKET AGENTS.—W. C. Hope, New York.

AMERICAN ASSOCIATION OF FREIGHT AGENTS.—R. O. Wells, East St. Louis, Ill. Next convention, April 21, Houston, Tex.

AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—E. H. Harman, St. Louis, Mo.; 3d Thursday and Friday in May.

AMERICAN ELECTRIC RAILWAY ASSOCIATION.—E. B. Burritt, 29 W. 39th St., New York. Mid-year conference, New York, January 29, 30, 31.

AMERICAN ELECTRIC RAILWAY MANUFACTURERS' ASSOC.—H. G. McConnaughy, 165 Broadway, New York. Meetings with Am. Elec. Ry. Assoc.

AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 75 Church St., New York.

AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago. Next convention, October 20-22, 1914, Los Angeles, Cal.

AMERICAN RAILWAY ENGINEERING ASSOCIATION.—E. H. Fritch, 900 S. Michigan Ave., Chicago. Next convention, March 17-20, Chicago.

AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, Karpen building, Chicago. June 15-17, Atlantic City, N. J.

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—A. R. Davis, Central of Georgia, Macon, Ga.

AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—C. W. Hunt, 220 West 57th St., New York; 1st and 3d Wed., except June and August, New York.

AMERICAN SOCIETY OF ENGINEERING CONTRACTORS.—J. R. Wenlinger, 11 Broadway, New York; 2d Tuesday of each month, New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York. Next meeting, St. Paul-Minneapolis, probably third week in June.

AMERICAN WOOD PRESERVERS' ASSOCIATION.—F. J. Angier, B. & O., Baltimore, Md. Next convention, January 20-22, 1914, New Orleans, La.

ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.—C. G. Phillips, Highland Park, Ill. Annual meeting, June 24, Minneapolis, Minn

ASSOCIATION OF RAILWAY CLAIM AGENTS.—C. W. Egan, B. & O., Baltimore, Md. Next convention, May, 1914, St. Paul, Minn.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W. Ry., Chicago.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, 112 West Adams St., Chicago. Next convention, May 20-23, New Orleans, La.

ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conard, 75 Church St., New York.

ASSOCIATION OF WATER LINE ACCOUNTING OFFICERS.—W. R. Evans, Chamber of Commerce, Buffalo, N. Y.

BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—L. D. Mitchell, Detroit Graphite Co., Detroit, Mich. Meeting with American Railway Bridge and Building Association.

CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk Ry., Montreal, Que.; 2d Tuesday in month, except June, July and August, Montreal.

CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, 413 Dorchester St., Montreal, Que.; Thursday, Montreal.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 North 50th Court, Chicago; 2d Monday in month, Chicago.

CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York; 2d Thurs. in Jan. and 2d. Fri. in March, May, Sept., Nov., Buffalo, N. Y.

CIVIL ENGINEERS' SOCIETY OF ST. PAUL.—L. S. Pomeroy, Old State Capitol building, St. Paul, Minn.; 2d Monday, except June, July, August and September, St. Paul.

ENGINEERS' SOCIETY OF PENNSYLVANIA.—E. R. Dasher, Box 704, Harrisburg, Pa.; 1st Monday after second Saturday, Harrisburg, Pa.

ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—E. H. Hiles, Oliver building, Pittsburgh; 1st and 3d Tuesday, Pittsburgh, Pa.

FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Richmond, Va. Next convention, May 20-22, Galveston, Tex.

GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—E. S. Koller, 226 W. Adams St., Chicago; Wed. preceding 3d Thurs., Chicago.

INTERNATIONAL RAILWAY CONGRESS.—Executive Committee, 11, rue de Louvain, Brussels, Belgium. Convention, 1915, Berlin.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—C. G. Hall, 922 McCormick building, Chicago. Annual convention, May 18-22, Chicago.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—Wm. Hall, 829 West Broadway, Winona, Minn. Next convention, July 14-17, Hotel Sherman, Chicago.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—A. L. Woodworth, Lima, Ohio. Next convention, third Tuesday in August.

MAINTENANCE OF WAY & MASTER PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—T. I. Goodwin, C. R. I. & P., Eldon, Mo. Next convention, November 17-19, 1914, Detroit, Mich.

MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York. Next annual meeting, May 26-29, Hotel Waldron, Philadelphia.

MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, Karpen building, Chicago. June 10-12, Atlantic City, N. J.

MASTER CAR & LOCOMOTIVE PAINTERS' ASSOC. OF U. S. AND CANADA.—A. P. Dane, B. & M., Reading, Mass.

NATIONAL RAILWAY APPLIANCE ASSOC.—Bruce V. Crandall, 537 So. Dearborn St., Chicago. Meetings with Am. Ry. Eng. Assoc.

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass.; 2d Tuesday in month, except June, July, Aug. and Sept., Boston.

NEW YORK RAILROAD CLUB.—H. D. Vought, 95 Liberty St., New York; 3rd Friday in month, except June, July and August, New York.

NORTHERN RAILROAD CLUB.—C. L. Kennedy, C. M. & St. P., Duluth, Minn.; 4th Saturday, Duluth.

PEORIA ASSOCIATION OF RAILROAD OFFICERS.—M. W. Rotchford, Union Station, Peoria; 2d Thursday.

RAILROAD CLUB OF KANSAS CITY.—C. Manlove, 1008 Walnut St., Kansas City, Mo.; 3d Friday in month, Kansas City.

RAILROAD MASTER TINNERS', COPPERSMITHS' AND PIPEFITTERS' ASSOCIATION OF NORTH AMERICA.—U. G. Thompson, Chicago & Eastern Illinois, Danville, Ill. Next convention, May 19-22, Marquette Hotel, St. Louis, Mo.

RAILWAY BUSINESS ASSOCIATION.—Frank W. Noxon, 30 Church St., New York.

RAILWAY CLUB OF PITTSBURGH.—J. B. Anderson, Penna. R. R., Pittsburgh, Pa.; 4th Friday in month, except June, July and August, Pittsburgh.

RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOC.—J. Scribner, 1021 Monadnock Block, Chicago. Meetings with Assoc. Ry. Elec. Engrs.

RAILWAY FIRE PROTECTION ASSOCIATION.—C. B. Edwards, Mobile & Ohio, Mobile, Ala.

RAILWAY GARDENING ASSOCIATION.—J. S. Butterfield, Lee's Summit, Mo.

RAILWAY DEVELOPMENT ASSOCIATION.—W. Nicholson, Kansas City Southern, Kansas City, Mo.

RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, Bethlehem, Pa.

RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, Box C, Collinwood, Ohio.

RAILWAY SUPPLY MANUFACTURERS' ASSOC.—J. D. Conway, 2135 Oliver bldg., Pittsburgh, Pa. Meetings with M. M. and M. C. B. Assocs.

RAILWAY TEL. & TEL. APPLIANCE ASSOC.—W. E. Harkness, 284 Pearl St., New York. Meetings with Assoc. of Ry. Teleg. Sups.

RICHMOND RAILROAD CLUB.—F. O. Robinson, Richmond, Va.; 2d Monday except June, July and August.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—L. C. Ryan, C. & N. W., Sterling, Ill. Next convention, September 8-10, 1914, Chicago.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug., St. Louis.

SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmonds, 3868 Park Ave., New York. Meeting with annual convention Railway Signal Association.

SOCIETY OF RAILWAY FINANCIAL OFFICERS.—C. Nyquist, La Salle St. Station, Chicago.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. & W. P. Ry., Montgomery, Ala.

SOUTHERN & SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Grant bldg., Atlanta, Ga.; 3d Thurs., Jan., March, May, July, Sept., Nov., Atlanta.

TOLEDO TRANSPORTATION CLUB.—J. G. Macomber, Woolson Spice Co., Toledo, Ohio; 1st Saturday, Toledo.

TRACK SUPPLY ASSOCIATION.—W. C. Kidd, Ramapo Iron Works, Hillsburn, N. Y. Meetings with Roadmasters' and Maintenance of Way Association.

TRAFFIC CLUB OF CHICAGO.—W. H. Wharton, La Salle Hotel, Chicago.

TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 290 Broadway, New York; last Tuesday in month, except June, July and August, New York.

TRAFFIC CLUB OF PITTSBURGH.—D. L. Wells, Erie, Pittsburgh, Pa.; meetings monthly, Pittsburgh.

TRAFFIC CLUB OF ST. LOUIS.—A. F. Versen, Mercantile Library building, St. Louis, Mo. Annual meeting in November. Noonday meetings October to May.

TRAIN DESPATCHERS' ASSOCIATION OF AMERICA.—J. F. Mackie, 7122 Stewart Ave., Chicago. Next convention, June 16, Jacksonville, Fla.

TRANSPORTATION CLUB OF BUFFALO.—J. M. Sells, Buffalo; first Saturday after first Wednesday.

TRANSPORTATION CLUB OF DETROIT.—W. R. Hurley, L. S. & M. S., Detroit, Mich.; meetings monthly.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y. Next meeting, Chicago.

UTAH SOCIETY OF ENGINEERS.—Fred D. Ulmer, Oregon Short Line, Salt Lake City, Utah; 3d Friday of each month, except July and August.

WESTERN CANADA RAILWAY CLUB.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man.; 2d Monday, except June, July and August, Winnipeg.

WESTERN RAILWAY CLUB.—J. W. Taylor, Karpen building, Chicago; 3d Tuesday of each month, except June, July and August.

WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, 1735 Monadnock Block, Chicago; 1st Monday in month, except July and August, Chicago.

Traffic News

R. M. Batcheller, division freight agent of the Atchison, Topeka & Santa Fe at St. Joseph, Mo., has been elected president of the Commerce Club of St. Joseph, succeeding C. D. Morris.

Because of the competition of the electric roads the Southern Pacific has discontinued all passenger train service on its line between Los Angeles, Cal., and Long Beach, 21 miles, and between Riverside and San Bernardino, 12 miles.

The Chicago branch of the National League of Commission Merchants has petitioned the Interstate Commerce Commission to take steps to require the various roads from Chicago to the west and northwest to restore the old freight train schedules providing for second morning delivery at St. Paul and Omaha instead of third morning delivery.

The Cashman distance tariff law, passed by the Minnesota legislature, went into effect on January 1, and all of the railways in the state have filed freight and passenger tariffs in accordance with its provisions. The rates ordered do not differ materially from those sustained by the Supreme Court in the Minnesota rate case, but they are based strictly on distance and do away with many special commodity rates.

The Pennsylvania Railroad Company reports that the total number of passengers carried on its trains in the year 1913 was 111,000,000; and not one was killed in a train accident. On the lines of the company east of Pittsburgh the number of passengers carried during the past six years has been nearly 600,000,000, of whom 16 were killed in train accidents, there having been one accident fatal to passengers in 1909, two in 1911 and two in 1912.

The freight traffic committee of the Chicago Association of Commerce has sent to the Interstate Commerce Commission resolutions urging upon the commission the propriety of causing all parties to the rate advance case "to proceed with all possible despatch to the end that a speedy determination of the question may be reached." The resolutions state that "long-continued uncertainty as to the final outcome will be detrimental to the commercial activities of the country." The association has previously adopted resolutions stating that it is not opposed to the advance in all-rail rates, but that it is opposed to any advance in lake-and-rail rates.

The Boston & Maine has prepared new passenger tariffs, providing for uniform rates throughout the company's system and superseding a great variety of rates which have been inherited from the times when different divisions on the lines were independent companies. The new tariffs are to be presented to the public commissions in the near future. It is understood that the new rates will on the average be considerably higher than those now in effect. The Boston & Maine has just begun the use of cards for season tickets in place of the books of coupons heretofore used. The conductor, for each ride, cuts out a piece from the edge of the card.

Lawyers Seeking Harvest from Missouri Rate Suits

The Kansas City *Journal* publishes the following in a despatch from Jefferson City: "It is evident from information that has come to Jefferson City in the last few days that 'snitching' on a large scale is in progress all over the state in connection with claims for excess freight and passenger charges by the railroads during the litigation over the validity of the maximum freight rate law and the 2-cent passenger rate law.

"It is said on good authority that agents for many lawyers and law firms are traveling over the state seeking persons who have paid excess fare and shippers who hold excess freight bills.

"Contracts are being made with those holding claims of this character by which the lawyers shall retain one-third of all the money recovered in suits against the railroads. In some instances it is reported the holder of the claims is required to deposit $15. This is said to have been going on all over the state for several weeks."

St. Louis-Kansas City Passenger Service Reduced

Beginning Sunday, January 4, the railways between St. Louis and Kansas City reduced their passenger service by withdrawing the midnight trains from St. Louis to Kansas City, rearranging their schedules so that other trains could handle the business. On December 31 representatives of the roads were asked to explain their action before the state public service commission which, after hearing the reasons advanced, took no action.

Among those who appeared for the roads were President Bush of the Missouri Pacific; P. S. Eustis, passenger traffic manager of the Chicago, Burlington & Quincy; E. B. Pryor, receiver, and Henry Miller, general manager of the Wabash; G. J. Charlton, passenger traffic manager of the Chicago & Alton, and L. M. Allen, passenger traffic manager of the Chicago, Rock Island & Pacific. All explained that the discontinuance of the trains was a necessary step of economy, caused by the financial condition of the roads, that the traffic could be adequately handled by the other trains, and urged the commission to co-operate with the roads by assisting in making retrenchments in expenses. President Bush assured the commission that the reduction in service in no way represented a spirit of retaliation because of the recent reduction in state passenger fares, but that the reduced revenue from local passenger service was an added reason for economy. Mr. Eustis said the Burlington has reduced passenger service by 2,000 train miles a day and intends to save 4,000 miles. Mr. Allen said the Rock Island had reduced its passenger train mileage by 4,000 miles in the past few months. Several of the speakers asserted that nearly every road in Missouri is practically on the verge of bankruptcy.

Revenues and Expenses of Large Steam Roads for November

The following figures are compiled from monthly reports of operating revenues and expenses of large steam roads for the month of November, 1913, on hand in the Division of Statistics, Interstate Commerce Commission, at 1 p. m., January 5, 1914. No reports are included for roads whose operating revenues for the year ended June 30, 1913, did not reach $1,000,000. The figures are compiled as rendered, and should not be considered final, inasmuch as scrutiny of the reports may lead to their modification before acceptance:

Item	United States		Eastern District		Southern District		Western District	
	1913	1912	1913	1912	1913	1912	1913	1912
Number of reports included	152		61		31		60	
For the Month of November								
Average number of miles operated	204,191.19	202,437.63	45,878.93	45,813.88	40,226.14	40,034.35	118,086.12	116,589.00
Total operating revenues	$229,410,400	$236,526,723	$84,867,163	$88,463,561	$39,921,758	$38,072,392	$104,621,479	$109,990,770
Total operating expenses	161,123,611	156,701,555	65,764,149	62,247,605	28,000,138	26,724,200	67,359,324	67,729,750
Net operating revenue	68,286,789	79,825,168	19,103,014	26,215,956	11,921,620	11,348,192	37,262,155	42,261,020
Revenues per mile	1,123	1,168	1,849	1,931	992	951	886	943
Expenses per mile	789	774	1,433	1,359	696	668	570	581
Net revenue per mile	334	394	416	572	296	283	316	362
For the Five Months Ending with November								
Average number of miles operated	203,821.91	201,746.84	45,907.31	45,809.09	40,201.64	40,017.46	117,712.96	115,920.29
Total operating revenues	$1,189,743,079	$1,176,242,287	$459,946,270	$453,454,799	$192,561,499	$183,363,877	$539,235,310	$539,423,611
Total operating expenses	813,770,842	761,706,699	332,672,324	301,720,925	137,631,545	129,461,779	343,466,973	330,523,995
Net operating revenue	375,972,237	414,535,588	125,273,946	151,733,874	54,929,954	53,902,098	195,768,337	208,899,616
Revenues per mile	5,837	5,830	9,976	9,898	4,790	4,582	4,581	4,653
Expenses per mile	3,992	3,776	7,247	6,686	3,424	3,235	2,918	2,851
Net revenue per mile	1,845	2,054	2,729	3,312	1,366	1,347	1,663	1,802
Comparative Figures Based on All Roads Having Revenues Above $1,000,000 Per Annum Reporting for November, 1912								
For the Month—	1912	1911	1912	1911	1912	1911	1912	1911
Average number of miles operated	221,196.81	218,774.28	57,847.57	57,593.38	41,455.80	41,114.47	121,893.44	120,066.43
Revenues per mile	$1,218	$1,093	$2,001	$1,787	$940	$874	$940	$835
Expenses per mile	809	734	1,395	1,235	661	615	681	534
Net revenue per mile	409	359	606	552	279	259	359	301
For Five Months—								
Average number of miles operated	220,773.03	218,564.20	57,842.76	57,513.70	41,439.28	41,079.59	121,490.99	119,970.91
Revenues per mile	$6,081	$5,545	$10,233	$9,288	$4,529	$4,275	$4,634	$4,186
Expenses per mile	3,952	3,630	6,812	6,172	3,206	2,952	2,645	2,645
Net revenue per mile	2,129	1,915	3,421	3,116	1,323	1,223	1,789	1,541

Illinois Manufacturers' Association Advocates Rate Advance

The Illinois Manufacturers' Association, which took a leading part in the opposition to an advance in freight rates in 1908 and in 1910, has now gone on record, through resolutions adopted by the directors, in favor of the proposed 5 per cent. advance asked by the roads in Official Classification territory. The following resolutions which were adopted, were proposed by a special committee of the directors appointed to investigate the question:

"Whereas, Your committee has found, first, that conditions with the railroads have changed materially since our association successfully opposed the request for an advance in 1910; and second, that the increase in wages granted through arbitration, the increase in taxes, the increased expenditure to insure greater safety to both the men and the public, and the increase caused by legislation of the full crew type have so increased the operating expenses of the railroads in general that the net revenues are insufficient to provide for that degree of rehabilitation and extension of facilities which prompt and efficient service to the shipper demands, and,

"Whereas, Your committee is convinced that shippers can better afford to pay a uniform advance of 5 per cent. than suffer in the future any impairment of railroad service; now therefore be it

"Resolved, That the Illinois Manufacturers' Association, through its board of directors, declares in favor of granting the request for a uniform increase of 5 per cent. of all rates in Official Classification Territory;

"Resolved, That this increase be applied, not to further wage advances, but to the rehabilitation and extension of facilities, so that the present service to the shipper be maintained and improved;

"Resolved, That a copy of these resolutions be sent to the members of the Interstate Commerce Commission and that it be requested to reach a final determination of the question as speedily as possible."

INTERSTATE COMMERCE COMMISSION

The Interstate Commerce Commission will hold its first public hearing in connection with its general investigation of the relations between railways and private car lines in Chicago on January 21. The commission has been investigating the subject and gathering data and statistics for over a year.

The commission has suspended from January 7 to May 7 a Detroit, Toledo & Ironton tariff, which proposed to increase from 8½ cents to 10 cents per hundred lb. the present rates on soda ash and caustic soda in carloads from Wyandotte and Detroit, Mich., to Hamilton, London and other points in Ontario. Similar increases between the same points via other lines are under investigation by the commission.

The commission has further suspended from January 8 to July 8 an item in a tariff of R. H. Countiss, agent, proposed to increase rates on canned apples in carloads from Portland, Ore., and other north Pacific coast points to St. Louis, Chicago, St. Paul and points west thereof, including Wichita and Topeka, Kan.

The commission has suspended schedules in tariffs of several of the eastern carriers, by which it was proposed to increase the rail and lake class rates from New York to the twin cities, and thereby to increase the differentials applying over rates to Du-

luth. Rates from all points of origin east of the Illinois-Indiana line are also affected.

The commission has further suspended from January 3 to July 3 tariffs of the Erie and New York, Susquehanna & Western which proposed to cancel rates on onions, in carloads and less than carloads, from interstate points to the local delivery stations of the Erie in New York City, viz.: Duane street, West Houston street, North river and Pier 7 East river, and to prohibit handling of inbound shipments of onions at these points.

The commission has suspended from January 1 to May 1, certain schedules in tariffs of F. A. Leland, agent, which proposed increased rates on malt in carloads from interstate points to Fort Worth and other points in Texas. The present rate from Chicago to Fort Worth is 34.5 cents; from Milwaukee 36.5 and from Minneapolis, 38 cents. It is proposed to increase these rates four cents per hundred lb. Rates from other points are affected in a like manner.

The commission has suspended from January 6 to May 6 a tariff of the Missouri Pacific and St. Louis, Iron Mountain & Southern, which proposed to cancel proportional joint rates on lumber and other forest products, in carloads, from Thebes, Ill., to certain points in Illinois located on the Chicago, Burlington & Quincy moving via Herrin, Ill. Combination rates would apply instead, resulting in increases of from 3.6 to 5.7 cents per hundred pounds. The present rate to Choat, Ill., for example, is 5 cents, the proposed combination rate is 10.7 cents.

The commission, as has been noted in this column, will hold a hearing on January 22, upon the question of proposed amendments to its regulations governing the transportation of explosives and other dangerous articles. Col. B. W. Dunn, chief inspector of the Bureau of Explosives, has prepared for submission at the hearing a revision of the regulations and a number of new shipping container specifications. He announces that, in order that the time of the commission may not be taken up on the 22nd in disposing of questions that can be agreed upon, he will be at the New Willard Hotel, Washington, D. C., on January 20 and 21 for the purpose of receiving and discussing additional suggestions for amendments to the regulations, or for changes in the proof to be presented to the commission. Copies of the latest proofs will be ready at that time.

Omaha-Wisconsin Grain Rates

Report by Commissioner McChord:

The commission finds that the proposed increased rates on wheat and corn from Omaha, Neb.; Council Bluffs, Ia., and lower Missouri river cities to certain local Wisconsin points on the Minneapolis, St. Paul & Sault Ste. Marie are reasonable. The increase is made for the purpose of re-aligning the Rock Island rates with those now in effect over the Chicago & Alton, Atchison, Topeka & Santa Fe and Wabash systems, and to conform to the grouping over the Minneapolis, St. Paul & Sault Ste. Marie on classes and commodities. (28 I. C. C., 602.)

Iron Rates Upheld

Thomas Iron Company v. Pennsylvania Railroad, et al. Opinion by the commission:

The commission holds that a rate of 60 cents per gross ton on imported iron ore in carloads from Girard Point, Philadelphia, Pa., to Island Park, Pa., is reasonable, even though it exceeds the rate to South Bethlehem, a more distant station. The rate to Island Park is not unreasonable in itself, nor does it bear an unreasonable relation to the South Bethlehem rate of 50 cents, so made because of short line competition via the Philadelphia & Reading. (28 I. C. C., 608.)

Texas Banana Rates

J. P. Bryant Company v. Fort Worth & Denver City et al. Opinion by the commission:

The complainant desires reparation for overcharges collected on rates of 86 and 81 cents on bananas in carloads shipped from New Orleans, La., to Amarillo, Tex., at a time when the published tariffs of the defendants contained a rate of 67 cents. The commission awards the reparation desired and also similar reparation for overcharges collected on shipments of cocoanuts in straight carloads or mixed carloads with bananas, based on a rate found to be unreasonable to the extent that it exceeded the rate of 81 cents per hundred lb. for bananas alone. A rate of 81 cents now in effect on bananas in carloads from New Orleans, La., to Amarillo, Tex., is found to be reasonable. The rate exceeds that from the former city to Texas common points, but it is the commission's desire to restrict rather than to extend such Texas common point rates. (28 I. C. C., 594.)

Rates on Soda Ash from Wyandotte, Mich.

Opinion by Commissioner Prouty:

It is proposed to make changes in the rates on soda ash and other commodities from Wyandotte, Mich., to Canadian points. The commission finds that the carriers have not justified the increase and says that, while it is given jurisdiction over traffic from a point in the United States to points in Canada and may act on the American lines over which it has jurisdiction, it is doubtful if it could require these American lines to establish and maintain for the future a rate to Canadian points. It can, however, require them to maintain rates which are now in effect until some affirmative action is taken by some Canadian lines over which it has no control, which prevent the continuance of these rates, or until the Canadian commission has acted in the matter. (28 I. C. C., 613.)

Kansas City & Memphis Rate Cancellation

Opinion by Commissioner Clements:

The St. Louis & San Francisco has proposed to cancel all of its joint rates made in connection with the Kansas City & Memphis, which runs from Rogers, a point on the Frisco, to Siloam Spring, on the Kansas City Southern, and having a branch to Fayetteville, also on the Frisco. The commission finds that the joint rates to Fayetteville, which is reached by both companies, may well be canceled, but that the joint rates to and from local points on the Kansas City & Memphis should be maintained, but that they may be made a reasonable amount above the junction-point rate. (28 I. C. C., 640.)

Ratings on Packing House Products

Opinion by Commissioner Clements:

It is proposed to cancel the fourth class ratings on cured meat in sacks to points in Arkansas from St. Louis and Kansas City, Mo., and a few other packing house centers, and to establish the rating of second class in western classification and applicable generally throughout the Southwest. The commission holds that the proposed change in classification is reasonable on the basis that it will promote the relative equality, both between packing house centers and points of destination. (28 I. C. C., 599.)

Iowa Class Rates

Iowa State Board of Railroad Commissioners v. Arizona Eastern et al. Supplemental report by Commissioner Prouty:

The complainant, as directed by the commission, has filed a statement, showing what stations should, in its opinion, fall into the five zones established for the purpose of stating rates between interior Iowa points and Colorado and Utah common points. The commission agrees that it is just to have the first zone begin at a line east of the Missouri river, for rates from the East are to be fixed so that there is to be a considerable territory directly east of the river which will take the Missouri river rates. Carriers are directed to establish class rates on this basis. The mileage schedules suggested by the commission to be applied between points in Iowa and points to the west of the Missouri river in Kansas and Nebraska, on the objection of the defendants, are to be changed so that the class A rates will be 45 per cent. of the first class rates instead of 40 per cent., the same as fifth class rates. The commission also allows certain arbitraries in cases where the movement may be over a route by two or more lines as compared to a longer route of a single line. Whenever the shorter route in such a case is exceeded by more than 5 per cent. by the longer over the single line, the former is to be allowed certain arbitraries unless the rate of the longer line is already lower. (28 I. C. C., 563.)

Rates to Texarkana Reduced

Texarkana Freight Bureau et al v. St. Louis, Iron Mountain & Southern et al. Opinion by Commissioner Meyer:

The complainants allege that the class and commodity rates from St. Louis, Kansas City, Memphis and points in central freight association and western trunk line territories to Texarkana are unjust as compared with the rates to Shreveport, La. The latter city is the more distant, whether distances be taken by the direct route through Texarkana or by the indirect and more commonly used routes through Thebes, Ill. The commission holds that class rates from the points in question to Texarkana should not exceed those maintained to Shreveport, and that rates to Texarkana should be regarded as maximum rates to all points intermediate via the direct line. The history of class rates to Shreveport and Texarkana and a comparison of these rates with the rates for equal distances to points entirely uninfluenced by water competition, show that the level of class rates from St. Louis, etc., to Shreveport is no longer influenced by water competition. It is also held that commodity rates to Texarkana, which to Shreveport make via the direct line, should not exceed those maintained to the latter point. On the other hand, commodity rates to Texarkana which to Shreveport make through the lower Mississippi crossings, should not exceed those to the latter city by more than a maximum of 6 cents per hundred lb. In the making of joint through rates on long distance traffic to local non-competitive points, the differentials above the rates to the basic point should bear some reasonable relation to the total distances involved. While carriers may properly meet water competition, the maintenance of a lower rate to one point than to other points which are intermediate, cannot be justified on the ground that it is necessary to suppress water competition. (28 I. C. C., 569.)

Pittsburgh Switching Charges

Waverly Oil Works Company v. Pennsylvania Railroad et al. Opinion by Commissioner Prouty:

The complainant alleges that the charge of four cents per hundred lb. for switching freight to and from its plant, located on the Pennsylvania Railroad at Pittsburgh, when complainant desires to move its shipments to and from Pittsburgh by lines other than the Pennsylvania, is unreasonable. The commission holds that it ought not, as a matter of discretion, even if it could, as a matter of law, establish a mere switching charge which the competitors of the Pennsylvania lines can absorb and under which they can obtain the virtual use of the Pennsylvania's terminals, which, although the largest in the Pittsburgh district, are none too extensive. The commission also holds that there is no undue prejudice because of a diversity in switching charges as between two localities served by one railroad. Nor is there unjust discrimination because of the circumstance that the different members of the Pennsylvania system accord the use of their Pittsburgh terminal to one another, while refusing it on the same terms to their outside competitors. The several parts of the system, although they may be operated as separate units, are entirely under single ownership. Finally, the defendants can hardly be compelled to deliver shipments received from the industries in the Pittsburgh shipping district to competitors to be carried to points which the Pennsylvania system itself can reach, or to establish joint rates to cover such shipments. On the other hand, joint rates may be established to cover shipments from points on competitive lines to points on the Pennsylvania in the Pittsburgh switching district, or from points on the Pennsylvania at Pittsburgh to points not reached by that road. The commission suggests, therefore, that such a system of joint rates be worked out by the carriers. (28 I. C. C., 621.)

STATE COMMISSIONS

The Alabama State Railroad Commission has ordered a reduction of one dollar a ton—from $2.75 to $1.75—in the rate on pig iron from the Birmingham district to Mobile.

Representatives of the Ohio, Wisconsin, Iowa, Missouri and Illinois state railway commissions, members of the express rates committee of the National Association of Railway Commissioners, held a meeting in Chicago on January 5 and adopted the following resolution: "That we approve the rules, regulations and classifications adopted by the Interstate Commerce Commission with the understanding that additional classifications are to be adopted by the interstate and various state commissions to cover other commodities, subject to future modifications, such as facts or conditions justify, and that the theory of stating rates by blocks or sub-blocks, without reference to rates specified thereunder by the Interstate Commerce Commission, be approved."

John P. Dohoney, investigator of accidents for the Public Service Commission of Pennsylvania, has made to that body a report showing the number of highway grade crossings in the state, accompanied by elaborate tables, giving the location and other particulars of each crossing. The report is based on statistics sent in by 114 steam railroads. These roads have 11,763 crossings of public roads, of which 1,619 are protected in some way; 602 by flagmen, 312 by electric bells, 361 by gates, 324 by gates and flagmen, and 19 by bells and flagmen. It is estimated that in addition to the crossings shown in the table there are 10,000 private grade crossings in the state. The number of persons killed at grade crossings in the past six years was 531, and of injured, 1,718. The number of persons killed has increased, as is shown by the following: Year 1908, killed, 72; 1909, 72; 1910, 86; 1911, 84; 1912, 106; 1913, 111. Of the 126 electric railroad companies in Pennsylvania 79 cross steam roads at 574 places. The statistical report of the Interstate Commerce Commission for the year 1911 shows the length of railroad in the state of Pennsylvania as 11,341 miles; so that the average number of grade crossings is about one to each mile of railroad.

The new Illinois Public Utilities Commission, which superseded the old Railroad and Warehouse Commission on January 1, was organized on January 2 by the appointment of the fifth member, Judge Owen P. Thompson of the circuit court, Jacksonville, Ill. The four members previously appointed are: James E. Quan, wholesale grocer, Chicago, chairman; Walter A. Shaw, civil engineer, Chicago; Richard Yates, former governor of Illinois, Springfield; and Frank H. Funk, who was Progressive candidate for governor at the last election. The members of the commission will receive salaries of $10,000 a year and the law provides for the appointment of a general counsel at $6,000 and a secretary at $5,000. The commission has jurisdiction over all public utilities in the state. A hearing was held at Chicago on January 5, at which the first subject for consideration was a recent street car accident in Chicago. The commission also issued an order that the employees of the state grain inspection department, which is under its jurisdiction, must pay fare instead of accepting railway passes for transportation in the performance of their duties. This was taken as confirmation of the position announced by the railways and the local transportation lines on January 1, that under the new law they can no longer carry city and state officers free. The commission has decided to hold two stated meetings in Chicago and two in Springfield each month.

COURT NEWS

The federal grand jury at Chicago is said to have begun an investigation of reports and evidence filed by the Interstate Commerce Commission regarding the relations between the New York Central Lines and the O'Gara Coal Company, involving charges of discrimination in rates and preferential treatment of the coal company while officers of the New York Central Lines held stock in the company.

The Commerce Court went out of existence on the night of December 31. Cases which were pending have been distributed among the district courts. Judge Knapp is now a circuit judge in the second circuit (Connecticut, New York and Vermont); Judge Mack in the seventh circuit (Illinois, Indiana and Wisconsin); Judge Carland in the eighth (Arkansas, Minnesota, etc.) and Judge Hunt in the ninth (Arizona, California, etc.).

Four Chicago coal companies have filed suit against the principal railways of the city in the United States district court charging failure of the roads to obey an order of the Interstate Commerce Commission prescribing coal rates. It is alleged that the Commission ordered that these complainants, located just outside of the Chicago switching district, were not to be charged more than 5 cents a ton in excess of the rate applying within the switching district, and that the roads are charging 15 cents more.

Railway Officers

Executive, Financial and Legal Officers

L. G. Scott has been appointed auditor of the Texas & Pacific, with office at Dallas, Tex, succeeding R. E. Williams, resigned.

A. P. Ottarson, assistant auditor of receipts of the Nashville, Chattanooga & St. Louis at Nashville, Tenn., has been elected controller, succeeding E. F. P'Pool, resigned.

C. E. Benton, general attorney of the Missouri Pacific at Ft. Scott, Kan., has resigned, and W. P. Waggener, general attorney at Atchison, Kan., has had his jurisdiction extended to include the duties formerly performed by Mr. Benton.

P. M. Ripley has been appointed assistant to the vice-president of the El Paso & Southwestern system, with office at New York. The jurisdiction of the officers of the El Paso & Southwestern has been extended over the Burro Mountain.

A G. Whittington, formerly superintendent of the San Antonio division of the International & Great Northern and recently acting general manager, has been elected vice-president and general manager, with office at Houston, Tex., succeeding the late Henry Martin.

L. C. Gilman, assistant to the president of the Great Northern, with office at Seattle, Wash., has been elected president of the Spokane, Portland & Seattle, Oregon Trunk, Pacific & Eastern and Spokane & Inland Empire, succeeding Joseph H. Young, resigned, effective January 1.

F. W. Pope has been appointed auditor of freight accounts of the Southern Pacific, with headquarters at San Francisco, Cal., succeeding W. T. Rowen, retired on account of failing health. J. C. Vinson having resigned to accept service elsewhere, the position of auditor of miscellaneous accounts has been abolished.

Horace R. McCormick has been appointed auditor of disbursements of the Philadelphia & Reading and subsidiary lines, with headquarters at Philadelphia, Pa., succeeding Josiah E. Price, retired, and Gordon Chambers has been appointed assistant real estate agent of the Reading Company, also the Philadelphia & Reading and subsidiary lines, with headquarters at Philadelphia.

The receivership of the Buffalo & Susquehanna Railroad was terminated on December 31, 1913, and H. I. Miller, who was receiver, has been made chairman of the board, and E. R. Darlow, who was assistant receiver, is now president. J. T. Elmer continues as auditor, and F. E. Hall, formerly treasurer, is now secretary and treasurer, all with headquarters at Buffalo, N. Y. The other officers and employees of the receiver are continued in the employment of the corporation.

Operating Officers

A. C. Becton has been appointed chief despatcher of the Missouri, Kansas & Texas at Denison, Tex.

J. W. Butts, trainmaster of the Missouri, Kansas & Texas at Greenville, Tex., has been appointed superintendent with headquarters at Greenville.

L. M. Dooley, terminal trainmaster of the Missouri Pacific at Omaha, Neb., has been appointed transportation inspector of the Texas & Pacific at New Orleans, La.

John K. Fahey, assistant superintendent of Morgan's Louisiana & Texas Railroad & Steamship Company, has been appointed superintendent of terminals at New Orleans, La.

James Burke, superintendent of roadway, bridges and buildings of the Erie at Cleveland, O., has been appointed superintendent of the Chicago terminals division, with headquarters at Chicago, Ill.

W. H. De France has been appointed superintendent of the Louisiana division of the Texas & Pacific, with headquarters at New Orleans, La., succeeding N. G. Pearsall, assigned to other duties.

B. C. Mulhern, superintendent of the Pittsburg, Shawmut & Northern at St. Marys, Pa., has been appointed general superintendent, with headquarters at St. Marys, and J. D. Beaver, assistant superintendent at St. Marys, succeeds Mr. Mulhern, with office at St. Marys.

J. R. Cavanaugh, superintendent of freight transportation of the Cleveland, Cincinnati, Chicago & St. Louis, and the Peoria & Eastern, with office at Indianapolis, Ind., has been appointed superintendent of car service. R. R. Harris, car accountant, with office at Indianapolis, is appointed superintendent of freight transportation, succeeding Mr. Cavanaugh, and the office of car accountant is abolished.

Charles E. Burr, superintendent of the Pennsylvania division of the Delaware & Hudson at Carbondale, Pa., has been appointed acting general superintendent of transportation, with headquarters at Albany, N. Y., succeeding Charles E. McKim, temporarily incapacitated on account of ill health, and C. A. Morgan, trainmaster at Carbondale, has been appointed acting superintendent of the Pennsylvania division, succeeding Mr. Burr.

Alva C. Elston, who has been appointed superintendent of the New York division of the Erie, with headquarters at Jersey City, N. J., as has been announced in these columns, was born on November 18, 1867, at Unionville, Orange county, N. Y., and was educated in the public schools of his native town. He began railway work in 1880, as student operator on the New York, Susquehanna & Western, controlled by the Erie. From 1881 to 1884, he was agent at various places, and then, for four years, he was operator. From 1888, to 1902, he was despatcher and chief train despatcher. In March, of the last named year he was promoted to the position of division operator on the Erie. In December, 1903, he was made superintendent of the New York, Susquehanna & Western, remaining in that position until August, 1904, when he became superintendent of the New York division and branches of the Erie at Jersey City, N. J. On June 8, 1910, he was appointed superintendent of the Buffalo division and branches with headquarters at Buffalo, N. Y.; in January, 1913, he became general agent at Chicago, and now returns as superintendent to the New York division of the same road, with headquarters at Jersey City, as above noted.

A. C. Elston

Thomas H. Beacom, who has been appointed general manager of the third district of the Chicago, Rock Island & Pacific, with office at El Reno, Okla., as has been announced in these columns, was born November 3, 1866, in Jones county, Iowa. He received a public school education and began railway work in 1882 with the Chicago, Milwaukee & St. Paul as timekeeper on a construction gang. He remained with the St. Paul until 1902, having been consecutively station helper, ticket clerk, express messenger, baggageman, passenger brakeman, conductor, yardmaster and general yardmaster. In August, 1902, he was made trainmaster of the Chicago, Rock Island & Pacific on the Illinois and Iowa divisions, and was promoted in February, 1904, to superintendent of the Oklahoma division of that road. He continued as superintendent until December, 1909, having been in charge successively of the Oklahoma, St. Louis, Kansas, Panhandle, Oklahoma and Missouri divisions. From December, 1909, until February, 1912, Mr. Beacom was general superintendent of the third district at El Reno, and from the latter date until his recent promotion he was assistant general manager of the third district at El Reno and later of the first district at Des Moines, Iowa. He is also

president of the Chicago, Rock Island & Gulf, with office at El Reno.

J. M. Davis, whose resignation as general superintendent of the central district of the Southern Pacific at San Francisco, Cal., effective January 1, was announced in these columns on December 26, page 1244, has been appointed assistant general manager of the Baltimore & Ohio Southwestern-Cincinnati, Hamilton & Dayton lines, with headquarters at Cincinnati, Ohio, a new position, effective January 1. Mr. Davis was born November 5, 1871, and began railway work in 1888 as a freight brakeman on the San Antonio & Aransas Pass. From September, 1891, to July, 1898, he was consecutively, stenographer to the superintend of the Gulf, Colorado & Santa Fe at Temple, Tex.; chief clerk to the superintendent of the Mexican Central at Tampico, Mex.; in the general manager's office of the Great Northern at Duluth, Minn., and assistant superintendent of the Great Northern at Melrose, Minn. In July, 1898, he was made superintendent of the Breckenbridge and Montana divisions of the Great Northern. In January, 1900, he went with the Erie as superintendent at Scranton, Pa.; two years later was made superintendent of the Union Steamboat Line of the Erie at Buffalo, N. Y., and was superintendent of the Allegheny division from August, 1902, to May, 1903. He then returned to the Great Northern, where he was superintendent successively of the Superior, Dakota and Minot divisions, and in July, 1905, was promoted to assistant general superintendent of the central district at Minot, N. D. He subsequently became assistant general superintendent of the Oregon Short Line, the Union Pacific and the Southern Pacific, with office at Salt Lake City, and from November, 1907, to June, 1908, he was acting general superintendent of those lines. He then became general superintendent of the Oregon Short Line and the Southern Pacific Company in Nevada, and from June, 1910, until his recent resignation he was general superintendent of the central district of the Southern Pacific Company at San Francisco.

J. M. Davis

Traffic Officers

Charles Carney has been appointed commercial agent of the Texas & Pacific, at Marshall, Tex.

W. H. Askew has resigned as general agent of the New Orleans, Mobile & Chicago at New Orleans, La.

George H. Cornell has been appointed traveling passenger agent of the Southern Pacific at Los Angeles, Cal.

Calvin Dutton, passenger agent of the St. Louis & San Francisco at the Union Station, St. Louis, Mo., has retired on a pension after 35 years of service.

Edward R. Ferry has been appointed general agent of the Illinois Central and the Yazoo & Mississippi Valley, at New Orleans, La., succeeding Hunter C. Leake.

W. VanValkenburgh has been appointed general baggage and mail agent of the Long Island, succeeding G. F. Chichester, retired under the pension rules after a service of 51 years with that road.

R. W. Rigdon has been appointed commercial agent of the Kansas City, Mexico & Orient of Texas, at Ft. Worth, Tex., succeeding F. E. Mitchell, resigned to engage in other business.

C. M. Andrews, traveling freight and passenger agent of the Southern Pacific at Tacoma, Wash., has been transferred to Seattle, Wash., and W. B. Nash, city passenger agent at Tacoma, has been appointed city freight and passenger agent.

Charles H. Morrill, chief clerk in the freight traffic department of the St. Louis & San Francisco, at St. Louis, Mo., has been appointed assistant general freight agent, with office at St. Louis, succeeding F. C. Dumbeck, resigned.

J. E. Blaine, traveling freight agent of the Vicksburg, Shreveport & Pacific at Temple, Tex., has resigned to become general agent of the Louisiana Railway & Navigation Company, at Dallas, Tex., succeeding George E. Reynolds, resigned.

R. Jackson, traveling export agent of the Mobile & Ohio, has been appointed general agent, foreign freight department, at St. Louis, Mo. George T. Dickson is appointed traveling foreign freight agent and J. M. Gurker, soliciting foreign freight agent, both at St. Louis, Mo., and H. W. Hoffman, soliciting foreign freight agent at Chicago.

K. M. Pinaire, traveling freight agent of the Southern Railway, at Pittsburgh, Pa., has been appointed traveling freight agent with headquarters at Cleveland, Ohio, succeeding J. B. Dunlap, who becomes chief clerk to the general agent at Charleston, S. C. A. R. McCormick has been appointed traveling freight agent with headquarters at Pittsburgh, Pa., succeeding Mr. Pinaire.

N. A. Beach, commercial agent of the Missouri Pacific, St. Louis, Iron Mountain & Southern, Denver & Rio Grande and Western Pacific at Joplin, Mo., has been transferred to St. Joseph, Mo., succeeding J. O. Barkley, resigned to accept service elsewhere. B. E. Sells, commercial agent at Ft. Scott, Kan., has been transferred to Joplin, succeeding Mr. Beach, and W. N. Carmony, traveling freight agent at Kansas City, has been appointed commercial agent at Ft. Scott, succeeding Mr. Sells. O. P. Applegate has been appointed commercial freight agent at Cairo, Ill., succeeding L. S. McDonald, resigned.

J. T. Conley, whose appointment as general freight agent of the Chicago, Milwaukee & St. Paul, with office at Chicago, has been announced in these columns, began railway work in 1877 with the Clinton, Dubuque & Minnesota, now the Dubuque division of the Chicago, Milwaukee & St. Paul. Until May, 1902, he was consecutively telegraph operator at La Crosse, Wis.; traveling freight agent at Milwaukee, Wis.; division freight and passenger agent at Winona, Minn.; assistant general passenger agent and commercial agent at St. Paul, Minn. In May, 1902, he was promoted to assistant general freight agent, with headquarters at Minneapolis, Minn., which position he held until his recent appointment as general freight agent at Chicago, effective January 1.

J. T. Conley

William C. Barnes, whose appointment as general freight agent of the El Paso & Southwestern System, with office at El Paso, Tex., has been announced in these columns, was born February 9, 1877, at Senoia, Ga. He began railway work on October 21, 1891, as a mailing clerk in the accounting department of the Texas & Pacific at Dallas, Tex., and was subsequently clerk in various capacities in the freight, accounting and freight claim departments of that road. In November, 1904, Mr. Barnes went with the El Paso-Northeastern System, now part of the El Paso Southwestern System, as a rate clerk in the traffic department at El Paso, and he was made chief clerk to the general freight agent on January 1, 1908. From March 1, 1912, until January 1, 1914, the date when his appointment as general freight agent became effective, he was assistant general freight agent at El Paso.

R. E. Morgan, general agent of the Georgia Railroad at Atlanta, Ga., having resigned to engage in other business, his former position has been abolished. S. W. Wilkes, commercial agent at Atlanta, has been appointed division freight agent. H. S. Young, commercial agent at Atlanta, is now traveling freight agent. L. B. Slaughter, soliciting agent at Atlanta, is now soliciting freight agent. W. M. McGovern, general agent at Augusta, is now division freight agent, and his former position has been abolished. G. W. Sturgis, soliciting agent at Augusta, is now soliciting freight agent. T. H. Yeargin, soliciting agent at Greenville, S. C., has been made soliciting freight agent at Atlanta. J. E. Longworth, traveling freight agent at Jacksonville, Fla., has resigned to go to another company, and his former position has been abolished. R. C. Wharton, traveling freight agent at St. Louis, Mo., has also resigned.

Engineering and Rolling Stock Officers

T. Nicholson has been appointed master mechanic of the Louisiana Railway & Navigation Company at Shreveport, La., succeeding M. F. McCarra, resigned.

George P. Turner has been appointed an assistant engineer on the Union Pacific, assigned to valuation work, with headquarters at Omaha, Neb., succeeding H. Bortin, resigned.

C. D. Ashmore, general foreman of the Chicago & North Western at Clinton, Ia., has been appointed master mechanic at Pekin, Ill. This is a position that has recently been created at Pekin.

J. O'Connor, assistant master mechanic of the Staten Island Rapid Transit Railway, and the Staten Island Railway at Clifton, Staten Island, N. Y., has been appointed master mechanic, with headquarters at Clifton, and his former position has been abolished.

Purchasing Officers

S. Lorimer has been appointed general stationer of the St. Louis & San Francisco, with office at St. Louis, Mo., succeeding C. J. Windsor, resigned to engage in other business.

G. E. Scott, assistant purchasing agent of the Missouri, Kansas & Texas, has been appointed acting purchasing agent, with office at St. Louis, Mo., succeeding G. A. Hickok, resigned.

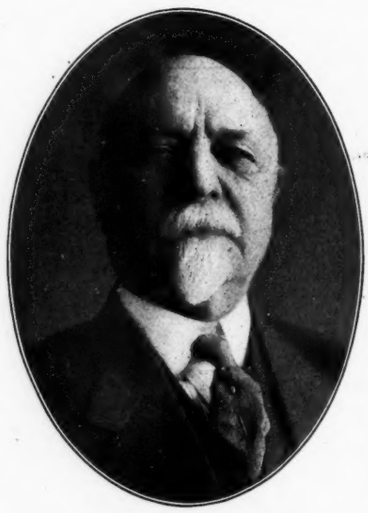
OBITUARY

Charles C. Riley, general superintendent of transportation of the Baltimore & Ohio, the Baltimore & Ohio Southwestern and the Cincinnati, Hamilton & Dayton, with headquarters at Baltimore, Md., died on January 6, in Washington, D. C. He was born on October 1, 1864, and was educated at Butler University and Central College of Physicians and Surgeons at Indianapolis, Ind. On July 1, 1883, he began railway work as a clerk in the freight office at Indianapolis of the Cincinnati, Indianapolis, St. Louis & Chicago, now a part of the Cleveland, Cincinnati, Chicago & St. Louis, and from April, 1885, to June, 1888, was car accountant of the Indianapolis, Decatur & Western, now a part of the Cincinnati, Hamilton & Dayton. He was then, to June, 1889, relief agent of the Cincinnati, Indianapolis, St. Louis & Chicago, and from July, 1889, to April, 1897, held various positions in the transportation department of the Cleveland, Cincinnati, Chicago & St. Louis. From April, 1897, to December, 1900, he was superintendent of car service and superintendent of transportation on the Baltimore & Ohio Southwestern, and from October, 1901, to July, 1903, was car service agent of the Chicago Great Western. He was appointed superintendent of car service on the Erie in July, 1903, and in September of the following year was made superintendent of transportation of the same road. In December, 1911, he was appointed assistant to general manager of the Baltimore & Ohio, and the following May was made general superintendent of transportation of the same road, also of the Baltimore & Ohio Southwestern and the Cincinnati, Hamilton & Dayton.

C. C. Riley

George W. Booth, controller of the Baltimore & Ohio, at Baltimore, Md., died on January 6, at his home in Baltimore. He was born on July 29, 1844, at Baltimore, and was educated at the Baltimore City College. In 1879, he began railway work as a clerk in the freight office at the Camden station of the Baltimore & Ohio, and from 1880 to 1881, was chief clerk at the same place. He was then, for three years, clerk in the accounting department, and from 1884 to 1890, was chief clerk to auditor of revenue, becoming auditor of revenue in 1890. He was appointed general auditor in 1894, remaining in that position until 1902, when he was made assistant controller, from which position he was promoted on December 1, 1909, to controller. His entire service had been with the Baltimore & Ohio.

Charles Edward Ways, assistant to general freight traffic manager of the Baltimore & Ohio at Baltimore, Md., died in that city on January 2. He was born at Frederick City, Md., and began railway work in 1853, as telegraph operator at Frederick Junction, Md. He was subsequently at Martinsburg, Va. From 1859 to 1861, he was payroll clerk in the transportation department, and then for two years was operator for the Baltimore & Ohio and in the United States Telegraph office at Washington, D. C. He then became chief operator of the Baltimore & Ohio, at Baltimore, and from 1865 to 1867 was assistant manager of the United States Telegraph Company at Baltimore. He was appointed general agent of the Washington county branch of the B. & O. in 1867, with office at Hagerstown, Md., remaining in that position until 1878, when he became division freight agent of the main line and branches east of the Ohio river. From October, 1881, to March, 1888, he was assistant general freight agent, and then, to March, 1897, general freight agent of the main stem and branches, including the Philadelphia division; and since March 1, 1897, he had been assistant to the general freight traffic manager. Mr. Ways' reminiscences cover an eventful half century. When he was telegrapher at Frederick Junction he was an active factor in the handling of trains on what was one of the busiest roads in the United States at that time. The telegraph was then in its infancy, and all messages between the government at Washington and the military commanders in the West, who were fighting Indians, had to be repeated at Frederick Junction. Ways was operator at Harper's Ferry at the time of the John Brown raid in 1860, and first sent the news of it to Washington and to the rest of the country.



C. E. Ways

Railways for Siberia.—It is reported that two proposals are under consideration for railway construction in Siberia. At the present time the only means of communication in the interior are native forest paths. The method of transporting goods is upon the heads of the natives and very often the routes are cut off by inter-tribal wars. The engineers will have to combat them and severe typographical difficulties besides.

Equipment and Supplies

LOCOMOTIVE BUILDING

THE CURARY OF ECUADOR has ordered 2 mogul type locomotives from the Baldwin Locomotive Works.

THE CHAMPION LUMBER COMPANY, Philadelphia, Pa., has ordered 1 Shay type locomotive from the Lima Locomotive Corporation.

CAR BUILDING

THE DELAWARE & HUDSON is inquiring for passenger cars.

THE BROOKLYN RAPID TRANSIT has ordered 100 cars for subway service from the American Car & Foundry Company.

THE RUTLAND is in the market for 8 coaches and 3 smoking, 3 combination mail and smoking, 1 mail, 3 baggage and 8 milk cars.

THE TOLEDO, ST. LOUIS & WESTERN is said to have ordered 1,000 freight cars from the Haskell & Barker Car Company. This item has not been confirmed.

IRON AND STEEL

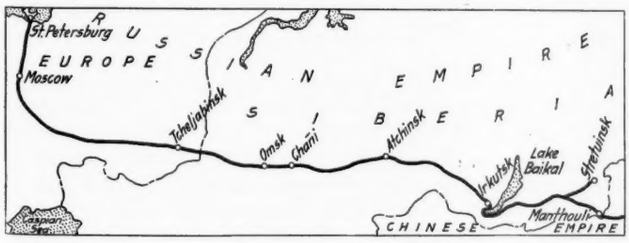
GENERAL CONDITIONS IN STEEL.—See editorial comments on this subject on another page.

TRADE PUBLICATIONS

PORTABLE HOISTS.—The Chicago Pneumatic Tool Company, Chicago, has used bulletin No. 149 to describe and illustrate the Chicago portable mine hoist.

STEEL CASTINGS.—The National Malleable Castings Company, Cleveland, Ohio, has just issued a little booklet entitled Electric Steel Castings, in which an attempt is made to show the many advantages of these castings over those made by the ordinary processes. Some pictures are given of typical castings and a word or two said about the various places in which they may be used.

DOUBLE-TRACKING THE TRANS-SIBERIAN RAILWAY.—A trip across the Trans-Siberian Railway at the present time requires nine days. Double-tracking is now going on between Tcheljabinsk in Russia and Manthouli on the Siberian frontier which, when completed, will shorten the journey to seven. It is hoped to finish the work by the autumn of this year and to inaugurate the new service by the following autumn. The Manthouli-Tanhoi



The Trans-Siberian Railway

section, 1,173 miles long, is practically finished. The section from Irkutsk to Atchinsk, 792 miles in length, is already completed. On the portion between the latter station and Chani, a good part of the rails have been laid, but some ballasting still remains to be done. Between Chani and Omsk, which are 183 miles apart, the new construction is already being used for service. The Omsk-Tcheljabinsk section is nearly finished, but some unfinished bridgework remains. The greatest engineering difficulties still to be met are to be found in the tunnels on the Lake Baikal section. All through passengers to and from St. Petersburg, it might be added, have to change at Tcheljabinsk which, therefore, is a rather important station.

Supply Trade News

The Browning Engineering Company, Cleveland, Ohio, manufacturer of the Browning crane, has changed its firm name to the Browning Company.

The Light Inspection Car Company, Hagerstown, Ind., has been reorganized, effective January 1, under the name of the Teetor-Hartley Motor Company. The management will remain unchanged.

The plant and assets of the Beaver Dam Malleable Iron Company, Beaver Dam, Wis., were sold on January 3 to the General Realization Company of Milwaukee for approximately $185,000 subject to confirmation in the bankruptcy court.

Kelly R. Johnston, formerly with the National Malleable Castings Company, of Cleveland, Ohio, has been appointed sales agent of the locomotive headlight department of the Remy Electric Company, Anderson, Ind., and assumed his duties on January 2.

The Jerguson Manufacturing Company, Boston, Mass., has changed its name to the Wiltbonco Manufacturing Company. The company, which is engaged in the manufacture of Wiltbonco locomotive and boiler specialties, will remain at the same address and continue under the same management.

E. M. Chadwick, formerly with the Fairbanks Company, has been appointed manager of the Buffalo branch of Manning, Maxwell & Moore, New York, railway and machinist tools and supplies and electric traveling cranes. D. A. Hamilton, formerly with the Reed Prentice Company, of Worcester, has been appointed assistant at Manning, Maxwell & Moore's Detroit branch.

The American Blower Company, Detroit, Mich., announces that on July 1 it acquired the patents covering air purifiers and humidity regulating devices formerly controlled by the McCreery Engineering Company. From now on the apparatus formerly manufactured by the latter firm will be manufactured and marketed by the American Blower Company itself under the trade name of Sirocco Purifiers and Humidity Controlling Devices.

E. L. Adreon, southwestern manager of the Westinghouse Air Brake Company and the Westinghouse Traction Brake Company, whose death was announced in this column last week, was born in St. Louis on December 23, 1847. He was educated in Wyman's St. Louis University and in 1865 entered the city comptroller's office as a clerk. He served in that office twenty years, the last eight of which he was comptroller, having been elected to that position for two terms. From 1887 to 1910 he held the position of vice-president and general manager of the American Brake Company. He was appointed to the position of southwestern manager August 1, 1888. In 1910 he ceased being general manager of the American Brake Company and remained from that time until his death its vice-president. Mr. Adreon was a man of wide business activity. He was secretary and treasurer of the Westinghouse Automatic Air and Steam Coupler Company, a director in the Adreon Manufacturing Company, and the president of the Emery Pneumatic Lubricating Company. He was noted as being a prominent club man in St. Louis and was president of the Missouri Chapter of the Sons of the American Revolution.

E. L. Adreon

Railway Construction

Alberta Metropolitan (Electric).—Incorporated by the Alberta legislature, with $500,000 capital, to build from Calgary, Alb., southeast to Shepard, about 10 miles. W. J. C. Madden, president, Calgary; W. H. Clipperton, vice-president, Toronto, Ont.; and E. P. Madden, secretary-treasurer, Calgary.

Arkansas Roads.—The Henry Wrape Company, St. Louis, Mo., which owns timber land near Langford, Ark., on the Pine Bluff, Arkansas River Railway, is planning to build a logging line, it is said, from Langford to a point about 12 miles north in Arkansas county.

Bruce Peninsula.—Incorporation has been asked for in Canada to build from Wiarton, Ont., or from a point in Keppel township, northerly through the townships of Amabel, Albemarle, Eastnor, Lindsay and St. Edmunds, to a point at or near Tobermory, with branches from different points on the route, and with power to operate ferries in connection with the lines. E. C. Spereman, Owen Sound, Ont., is solicitor for applicants.

Chicago, Milwaukee & St. Paul.—Plans are being made to build an extension of the Tacoma Eastern, it is said, from Morton, Wash., south through the Big Bottom country. It is understood that surveys have been made for two branches, one east to Vern, thence south to the Lewis river, and the other branch west, thence south, passing on the west side of Mount St. Helens to the Lewis river.

Chicago, Springfield & Cairo.—This company, which was incorporated in Illinois, last year, to build from Chicago, south to Springfield and Cairo is making financial arrangements, it is said, to carry out the work, and has secured a considerable part of the right of way. Emory D. Fraser is counsel of the company, which has its headquarters at Chicago. (July 5, p. 37.)

Chicago & Wabash Valley.—An officer of this company, which operates a line from McCoysburg, Ind., north to Dinwiddie, 32 miles, writes that surveys are being made for an extension south from McCoysburg to Mountmorenci, 30 miles, also for an extension from the present northern terminus to Crown Point, six miles.

Dixie Railway.—An officer of this company, which started work some time ago on a line from Alexander City, Ala., south to Benson, 15 miles, writes that the company is just completing the grading on 14 miles and track laying on seven miles. W. E. Benson, president, Benson, Ala. (August 1, p. 211.)

Jonesport Central & Northern.—See Maine Roads.

Fort Scott & Pittsburg (Electric).—Incorporated in Kansas with $100,000 capital to build from Fort Scott, Kan., south via Garland, Acadia and Frontenac to Pittsburg, about 40 miles. The incorporators include A. C. Dickman, A. N. Keene, R. B. Barr and W. Glung.

Madisonville & Nortonville Light, Power & Traction.—Incorporated in Delaware to build from Madisonville, Ky., south via Earlington, Mortons Gap and Barnsley to Nortonville, 12 miles. Surveys have been made from Madisonville to Earlington, four miles. J. Breathitt, Jr., Hopkinsville, may be addressed.

Maine Roads.—According to press reports capitalists of New York are back of a project to build from Jonesport, Maine, north to Oakfield, a junction point on the Bangor & Aroostook about 115 miles. The legislature in 1913 granted a renewal of a charter for the construction of the Jonesport Central & Northern, which will include 21 miles of the projected route connecting with the Maine Central at Columbia Falls. The town of Jonesport has voted to give $25,000 towards the building of the line. George Mansfield, Jonesport; G. M. Hanson, Calais; C. F. Stackpole, W. B. Pierce and H. J. Chapman, Bangor, are interested.

New York Subways.—The New York Public Service Commission, First district, on December 31, 1913, executed seven new construction contracts for different sections of the Dual System of rapid transit as follows: Section No. 2 of Route No. 39, which includes the greater part of the New Utrecht avenue elevated railroad in the borough of Brooklyn; contract let to Post & McCord, Incorporated, at $1,672,190. Section No. 1-A of Routes Nos. 19 and 22, which is that part of the Southern boulevard and Westchester avenue branch of the Lexington avenue subway between One Hundred and Forty-seventh street and Whitlock avenue; contract let to Rodgers & Hagerty, at $2,253,159.25. Section No. 1 of Route No. 16, which is that part of the Jerome avenue branch of the Lexington avenue subway (elevated construction) between One Hundred and Fifty-seventh street and One Hundred and Eighty-second street; contract let to the Oscar Daniels Company, at $1,077,978. Section No. 3 of Routes Nos. 4 and 38, which is that part of the Seventh avenue subway in the borough of Manhattan running under Varick street and Seventh avenue Extension from Beach to Commerce street; contract let to the Degnon Contracting Co., at $2,185,063. Section No. 5 of Routes Nos. 4 and 38, which is that part of the Seventh avenue subway in the borough of Manhattan running under Seventh avenue from Sixteenth to Thirtieth streets; contract let to the Canavan Brothers Company, at $2,401,306. Section No. 2 of Route No. 18, which is that part of the White Plains road extension of the existing subway (elevated construction) running over White Plains road from Burke avenue to Two Hundred and Forty-first street; contract let to Alfred P. Roth, at $958,484, and Route No. 50, which is the extension of the Steinway tunnel from its present terminus in the borough of Queens to the Queensboro bridge plaza (subway and elevated construction); contract let to the Degnon Contracting Company, at $557,856. The commission has also awarded the construction contract for Section No. 6 of the Seventh avenue subway in the borough of Manhattan to the Rapid Transit Subway Construction Company, the lowest bidder, for $2,292,943.50. This section lies in Seventh avenue between Thirtieth and Forty-second streets. (Dec. 12, p. 1147.)

Northwestern Electric.—Incorporated in South Carolina with $100,000 capital, it is said, to build from Easley, S. C., south to Augusta, Ga. The names of the incorporators are not given.

Springfield, Rochester & Hillsboro (Electric).—Incorporated in Illinois, it is said, to take over the rights and property of the Springfield, Clear Lake & Rochester, which owns a line connecting Springfield and Rochester with a branch to Clear Lake. The new owners plan to build an extension south to Hillsboro. A. Barker, Springfield, is president, and the incorporators include F. McGowan, N. J. Hamilton, M. D. Barker and J. H. Thomas, all of Springfield.

Tacoma Eastern.—See Chicago, Milwaukee & St. Paul.

Toronto Eastern (Electric).—An officer writes that this company has work finished on 4.8 miles in the townships of Whitby and Whitby East between Whitby, Ont., and Oshawa, and in the township of Whitby East and Darlington on 8.7 miles between Oshawa and Bowmanville. Work is now under way between Whitby and Pickering on 6.5 miles, Ewan MacKenzie, Toronto, is the contractor. An extension is also projected from Pickering to a point in the township of Scarboro, 15 miles. E. W. Oliver, chief engineer, 9 Toronto street, Toronto. (March 7, p. 450.)

Tennessee Railway.—An officer writes that the company completed work during 1913, from Little Creek, Tenn., to Charleys Branch on 4 miles, and on a spur line up Craggy creek, 2.5 miles.

Wabash.—An officer writes that the company has made a survey recently for a new track between Hannibal, Mo., and Quincy, Ill., but it is probable that nothing further will be done this winter.

Western Traction of Pittsburgh.—Incorporated in Pennsylvania with $5,000 capital, to operate lines in Allegheny, Fayette and Washington counties, Pa. The incorporators include A. B. Crawford and A. L. Davies, both of Pittsburgh; F. J. Taylor, Munhall; B. C. Hovis, Crafton, and W. H. Lorimer, Wilkinsburg.

RAILWAY STRUCTURES

New Orleans, La.—The Louisville & Nashville has announced its intention of building a large new freight depot on the block between Julia, St. Joseph, Water and Delta streets as soon as the necessary permits are obtained from the city council.

Railway Financial News

ALABAMA GREAT SOUTHERN.—Potter, Choate & Prentice, New York, have bought from the company and are offering to the public $2,500,000 Alabama Great Southern first consolidated mortgage 5 per cent. bonds, series A, December 1, 1913-1943, at 98½, yielding about 5.10 per cent. interest on the investment. These bonds are secured by a mortgage on the entire property of the railroad company subject to two prior lien mortgages under which bonds have been issued to the aggregate amount of $19,600 per mile. The Alabama Great Southern owns 290 miles of road and has outstanding $3,380,350 6 per cent. preference stock and $7,830,000 ordinary stock on which it is paying 5 per cent. dividends.

ATCHISON, TOPEKA & SANTA FE.—An officer of the company says that the report that the St. Louis, El Reno & Western has been acquired by the Atchison, Topeka & Santa Fe, has no foundation in fact. The directors of the Santa Fe have given no consideration to such a purchase.

BOSTON & MAINE.—The directors of the port of Boston have awarded to the Boston & Maine the sum of $725,000 as payment for the pier of the company in East Boston, which was taken by the port, by right of eminent domain, for the purpose of making it a state dock. The engineer of the port is making plans for rebuilding and enlarging the dock and for dredging the channel on both sides of it.

Chairman Elliott has been in Washington this week conferring with Attorney General McReynolds, concerning the demands of the government relative to the modification or abandonment of the control of the B. & M. by the New York, New Haven & Hartford; and it is understood that one of the plans presented by the road is for the creation of a board of trustees (satisfactory to the Department of Justice and the state of Massachusetts) to hold the stock of the Boston Railroad Holding Company ten years, or for a sufficient time to permit the restoring of Boston & Maine dividends. At the trust's termination the majority of Boston & Maine stock would be sold and the proceeds distributed to the stockholders of the New Haven, who are the real owners of the Boston Holding Company. Rumors have it that cancellation of the Fitchburg lease is also being considered, and that the Delaware & Hudson might take the road.

The directors of the B. & M. on December 31 voted to pay all fixed charges, interest and rentals due on January 1, aggregating $1,500,000. Vice-president Hobbs said at the same time that 4½ per cent. bonds of the Concord & Claremont to the amount of $500,000, maturing January 1, would be paid, a large proportion, however, being exchanged for new bonds bearing 5 per cent. interest.

It is reported that the banking interests which are carrying loans of the Hampden Railroad have made a satisfactory agreement with the directors of the Boston & Maine.

Bankers in Boston expect that the notes of the B. & M. due in February, to the amount of $10,000,000, will be paid by the sale of bonds of the Maine Central.

BUFFALO & SUSQUEHANNA.—The receivership has been terminated and E. R. Darlow, president of the Buffalo & Susquehanna Railroad Corporation, Buffalo, N. Y., announces the following list of officers of the company: H. I. Miller, chairman of the board; E. R. Darlow, president; T. J. Elmer, auditor; F. E. Hall, secretary and treasurer; W. E. Farris, general freight and passenger agent, and purchasing agent; J. S. May, superintendent; A. M. Darlow, superintendent of motive power, and G. A. Clark, superintendent of car service.

KANSAS CITY, MEXICO & ORIENT.—In the Federal Court at Kansas City, Kan., January 6, Judge Pollock ordered the preparation of a decree of sale for the properties of this company. It is expected that in the coming reorganization the Kansas City Outer Belt Railroad Company will be merged with the K. C. M. & O.

NEW YORK CENTRAL & HUDSON RIVER.—J. P. Morgan has resigned his place as a director in the New York Central and in the five subsidiary companies in the boards of which he sat.

NEW YORK, NEW HAVEN & HARTFORD.—J. P. Morgan has resigned his place as director in this company and in the boards of the nine subsidiary companies of which he was a director; also his place on the board of the Rutland.

ST. LOUIS & SAN FRANCISCO.—J. W. Lusk, one of the receivers, says that an effort is being made to bring the receivership to an end next May. Receivers' certificates to the amount of $1,500,000 have been issued. It is said that one-third of this sum has been taken by a syndicate of five St. Louis bankers, the other two-thirds being sold in New York; names of buyers not stated.

UNION PACIFIC.—The executive committee on Tuesday last voted to recommend to the directors, at their special meeting this week, that the $82,087,800 Baltimore & Ohio stock owned by the company be distributed among the holders of the common stock as an extra dividend, in addition to $3 a share in cash. It will also recommend that the Union Pacific's regular annual dividend rate be reduced from 10 per cent. to 8. The Union Pacific owns $53,607,800 Baltimore & Ohio common and $28,480,000 preferred. At the closing prices of Monday the market value of the $82,087,000 stock was $70,067,742. As the common stock of the Union Pacific aggregates $216,635,400, the $3 a share cash dividend to be declared calls for $6,499,062, making the total money value of the forthcoming dividends $76,566,804. There are outstanding $36,736,200 Union Pacific 4 per cent. bonds, convertible into common stock at 175. The distribution is counted upon by the executive committee to induce the holders of the bonds to convert them into common stock. This would relieve the Union Pacific of one mortgage. About $23,000,000 of the Union Pacific's Baltimore & Ohio stock is deposited as collateral against Oregon Short Line 25-year 4 per cent. collateral trust bonds. and if the stock is distributed it will be necessary to substitute other stocks.

LOWER RATES TO RELIEVE LABOR SCARCITY IN RUSSIA.—The agricultural associations of Kovno and Vilna are intending to present a petition to the Russian government for the establishment of a special low railroad rate for the transportation of laborers from other provinces of Russia to the northwestern districts. There is a scarcity of agricultural laborers, partly caused by the increased emigration to the United States and Germany. Many industrial concerns are also feeling a shortage, due partly to extensive municipal and government construction work.

A STORAGE BATTERY REPAIR CAR IN GERMANY.—The electric railway authorities of Dusseldorf, Germany, have recently put in service a storage battery tower car for use in the repairing of overhead wires. The car weighs a little over 3½ tons and is capable of a maximum speed of 17 miles an hour. It is equipped with two 6 horse power electric motors, accumulators supplying the necessary current, capable of running the car about 60 miles on a single charge. The New York, Westchester & Boston in this country has a somewhat similar idea in its gas-electric wrecking car.

OPENING OF INDO-CEYLON RAILWAY.—The Indo-Ceylon Railway was expected to be formally inaugurated early this month. The opening, however, will probably not take place before the first part of March, because it is not expected that the work will be completed before the middle of February. The part of the road in India is practically finished. The Ceylon authorities report favorable progress and announce that the construction of the roller bridge which spans the Taumbem passage on the Indian side is rapidly nearing completion. Some trouble was experienced because the proper settling of the bank of the railway between Madawachi and Talaimannar was retarded because of lack of rain. The opening of this railway will bring about an immense improvement over the existing transportation facilities between India and Ceylon. The trip will be shortened by several hours and the necessity of a night's journey by sea between Tuticorin and Colombo eliminated.

ANNUAL REPORT.

SOUTHERN PACIFIC COMPANY—REPORT OF THE BOARD OF DIRECTORS.

NEW YORK, December 19, 1913.

To the Stockholders of the Southern Pacific Company:

The Board of Directors submit herewith their report of the operations of the Southern Pacific Company and of the Proprietary Companies for the fiscal year ended June 30, 1913.

PROPERTIES AND MILEAGE.

The transportation lines constituting the Southern Pacific System, June 30, 1913, were as follows:

Divisions.	First main track.	Additional main track.	Sidings.	Ferries.	Water lines.
A.—*Mileage of lines belonging to or leased by Companies, the capital stocks of which are principally owned by the Southern Pacific Company:*					
(1)—Operated by the Southern Pacific Company under leases to it:					
Central Pacific Ry.	2,124.20	176.56	830.79	9.90	125
Oregon & California R. R.	690.09	1.09	157.25		
Southern Pacific R. R.	3,528.77	186.11	1,457.81	3.00	
South Pacific Coast Ry.	96.72	10.14	54.25	3.00	
(2)—Operated by the Companies owning them:					
Morgan's Louisiana & Texas Railroad & Steamship Co.	404.53	40.22	226.65	3.00	114
Louisiana Western R. R.	207.83	...	68.68		
Texas & New Orleans R. R.	452.62	3.46	175.22		
Galveston, Harrisburg & San Antonio Ry.	1,338.13	6.59	318.09		
Houston, East & West Texas Ry.	190.94	...	54.13		
Houston & Shreveport R. R.	39.78	...	7.26		
Houston & Texas Cen. R. R.	789.01	1.27	242.16		
Arizona Eastern R. R.	366.59	...	76.43		
Corvallis & Eastern R. R.	140.58	...	15.35		
Southern Pacific Company	.....	...	.....	...	4,683
B.—*Mileage of lines belonging to Companies, the capital stocks of which are principally owned by the Morgan's Louisiana & Texas R. R. & S. S. Co., but which are operated by the Companies owning them:*					
Iberia & Vermilion R. R.	16.09	...	7.00		
Direct Navigation Co.	.....	...	.....	...	75
Total	10,385.88	425.44	3,691.07	18.90	4,997
Less leased to outside companies	55.82	.34	16.15		
Total mileage operated June 30, 1913	10,330.06	425.10	3,674.92	18.90	4,997
Total mileage operated June 30, 1912	10,058.17	384.34	3,523.13	18.90	4,997
Increase	271.89	40.76	151.79		

INCOME FOR THE YEAR.

The gross receipts and disbursements of the Southern Pacific Company in respect to its leased lines, and of the Proprietary Companies in respect to lines not leased, and the other receipts and disbursements of the Southern Pacific Company and of such Proprietary Companies, after excluding all offsetting transactions between them, were as follows:

	This Year. †	Last Year.	+Increase. —Decrease.	Per Cent.
Average miles of railway operated:				
Lines East of El Paso	3,435.01	3.434.97 +	.04	....
Lines West of El Paso	6,875.98	6,535.43 +	340.55	5.21
Total	10,310.99	9,970.40 +	340.59	3.42
OPERATING INCOME.				
Revenue from transportation—rail lines	$130,353,692.66	$120,433,055.64 +	$9,920,637.02	8.24
Revenue from outside operations	12,421,012.41	11,092,114.95 +	1,328,897.46	11.98
Total	$142,774,705.07	$131,525,170.59 +	$11,249,534.48	8.55
Operating expenses—rail lines	$82,135,109.49	$75,652,106.32 +	$6,483,003.17	8.57
Expenses outside operations	10,734,300.58	10,838,936.91 —	104,636.33	.97
Taxes (rail lines and properties dealt with as outside operations)	5,697,285.83	5,621,238.96 +	76,046.87	1.35
Total	$98,566,695.90	$92,112,282.19 +	$6,454,413.71	7.01
Net operating income over expenses and taxes	$44,208,009.17	$39,412,888.40 +	$4,795,120.77	12.17
OTHER INCOME.				
Interest on bonds owned by Proprietary Companies	$2,904,165.10	$2,040,929.85 +	$863,235.25	42.30
Interest on bonds owned of companies other than Proprietary Companies	3,335,040.27	2,670,883.49 +	664,156.78	24.87
Dividends on stocks owned of companies other than Proprietary Companies	3,230,061.82	1,066,908.44 +	2,163,153.38	202.75
Income from lands and securities, not pledged for redemption of bonds	510,891.01	740,146.64 —	229,255.63	30.97
Income from sinking funds pledged for the redemption of bonds	263,742.90	219,314.11 +	44,428.79	20.26
Balance of interest received on loans and of interest accruing to June 30, on open accounts other than with Proprietary Companies	1,369,218.04	1,995,762.27 —	626,544.23	31.39
Miscellaneous income	129,053.14	118,574.56 +	10,478.58	8.84
Total	$11,742,172.28	$8,852,519.36 +	$2,889,652.92	32.64
Total net operating and other income	$55,950,181.45	$48,265,407.76 +	$7,684,773.69	15.92
FIXED AND OTHER CHARGES.				
Interest on outstanding funded debt of Southern Pacific Co. and Proprietary Companies	$25,201,044.93	$23,559,447.38 +	$1,641,597.55	6.97
Sinking fund contributions and income from sinking fund investments	773,834.49	501,494.11 +	272,340.38	54.31
Hire of equipment—balance	600,581.05	642,158.52 —	41,577.47	6.47
Rentals for lease of road, joint tracks, yards, and other facilities	702,030.44	142,307.03 +	559,723.41	393.32
Land department expenses	116,639.65	187,849.02 —	71,209.37	37.91
Taxes on granted and other lands	256,934.39	347,528.70 —	90,594.31	26.07
Miscellaneous expenses	82,555.02	60,585.98 +	21,969.04	36.26
Taxes and other expenses of Southern Pacific Company	291,243.30	245,899.01 +	45,3 .29	18.44

†The figures for this year include those of the Arizona Eastern R. R. Co. and of the Corvallis & Eastern R. R. Co., which have not heretofore been dealt with as "Proprietary Companies."

Additions and betterments payable from income of Southern Pacific Company...	71,219.37	25,232.60 +	45,986.77	182.25
Amortization of discount on funded debt	7,766.41	..... +	7,766.41	....
Expenditures for surveys and examinations for water power, written off.	286.11	95,691.76 —	95,405.65	99.70
Reserve for depreciation of rolling stock owned by Southern Pacific Company and leased to other companies	978,239.14	854,060.67 +	124,178.47	14.54
Total	$29,082,374.30	$26,662,254.78 +	$2,420,119.52	9.08
Surplus over fixed and other charges	$26,867,807.15	$21,603,152.98 +	$5,264,654.17	24.37

Surplus over fixed and other charges brought over (equivalent to 9.85 per cent. on the outstanding capital stock of the Southern Pacific Company).....$26,867,807.15

Applied as follows:

Dividends on common stock, viz.:		
1½ per cent. paid January 2, 1913.....	$4,090,086.08	
1½ per cent. paid April 1, 1913	4,090,086.08	
1½ per cent. payable July 1, 1913	4,090,086.08	
1½ per cent. payable October 1, 1913.....	4,090,086.08	
Dividends on stocks of Proprietary Companies held by the public	588.00	
		16,360,932.32
Surplus after payment of dividends.....		$10,506,874.83

The surplus for the year after payment of dividends, compared with the preceding year, shows an increase of $5,264,909.17 or 100.43 per cent.

During the past ten years, although there has been an increase of only 16.61 per cent. in the mileage of all tracks operated, taxes have increased $3,586,745.19 or 169.94 per cent. During the same period, the taxes per mile of all tracks operated have increased from $238.69 to $552.54.

The decrease in the income for the year from interest on loans and open accounts, is the result, principally, of taking over bonds, during the preceding year, in settlement of construction advances made to the railways purchased by Central Pacific Railway Company, referred to on page 7 of last year's report, and in settlement of advances to the Pacific Electric Railway Company. This decrease is offset by the increased interest received on the bonds so taken over.

The increase in the interest on the outstanding funded debt is the result, principally, of a full year's interest charge this year, on the bonds assumed by the Central Pacific Railway Company in the purchase of properties referred to on page 7 of last year's annual report, and the interest for the year on the outstanding funded debt of the Arizona Eastern Railroad Co., and on that of the Corvallis & Eastern Railroad Co., not heretofore included.

The increase during the year in the charge for rentals for lease of road, joint tracks, yards, and other facilities is principally the result of complying with accounting regulations, effective July 1, 1912, prescribed by the Interstate Commerce Commission for carriers by water, under which regulations certain items formerly dealt with as outside operations are now dealt with as debits and credits to Income Account.

Under the provisions of the lease to the Southern Pacific Company, the expenditures for additions and betterments to the property of the South Pacific Coast Railway Co., are payable by the Lessee, and are, therefore, a charge to its income. Such expenditures during the year amounted to $71,219.37.

The year's income is charged with $773,834.49 for sinking fund contributions, and income from sinking fund investments, pledged for the redemption of bonds. The proceeds from the sale of lands, also pledged for the redemption of bonds, amounted to $473,739.82. These sums, aggregating $1,247,574.31, are dealt with as Profit and Loss items, for the reason that they are applied in reducing the bonded indebtedness of the Companies.

The Southern Pacific Company does not take into either its income or assets, the interest on advances made by it for the construction of new railways by companies incorporated in its behalf, or for the acquisition of new lines, until the principal of such advances has been repaid with interest, either in cash, or in stocks and bonds of the companies. The interest thus included in the cost of the railways is the amount authorized to be charged to such cost under the accounting regulations of the Interstate Commerce Commission.

CAPITAL STOCK.

The capital stock of the Southern Pacific Company outstanding at the beginning of the year amounted to.....	$272,675,730.64
Less: Decrease during the year, account preferred stock called for redemption June 8, 1909.....	3,325.00
Amount of Southern Pacific Company stock outstanding June 30, 1913	$272,672,405.64

None of the Proprietary Companies either issued or retired any capital stock during the year. The only change in the amount of stocks of the Proprietary Companies from the amount reported last year is the result of including the stocks of the Arizona Eastern R. R. Co. and the Corvallis & Eastern R. R. Co., which have not heretofore been dealt with as "Proprietary Companies."

Stocks of Proprietary Companies outstanding at the beginning of the year as shown by last year's report		$334,790,572.00
Stocks of Arizona Eastern R. R. Co. and Corvallis & Eastern R. R. Co. outstanding at the beginning of the year, viz.:		
Arizona Eastern R. R. Co.....	$9,000,000.00	
Corvallis & Eastern R. R. Co.....	1,410,000.00	
	$10,410,000.00	
Total stocks of Proprietary Companies outstanding June 30, 1913		$345,200,572.00

These stocks were held as follows:

Owned by Southern Pacific Company	$344,768,300.00
Owned by Morgan's Louisiana & Texas R. R. & S. S. Co.	349,500.00
In the hands of the public	82,772.00
Total	$345,200,572.00

FUNDED DEBT.

In March, 1913, to provide for the purchase of new equipment, an equipment trust known as "Southern Pacific Equipment Trust, Series 'A,'" was created, and an issue of $10,120,000 face value, four and one-half per cent. equipment trust certificates authorized, all of which the trust provides shall be guaranteed by the Southern Pacific Company. Certificates of this issue to the amount of $5,000,000, face value, were issued during the year.

In June, 1913, to provide funds for corporate purposes, the Southern Pacific Company authorized an issue of "One-Year Five Per Cent. Secured Gold Notes" to an amount not exceeding $30,000,000, face value. Notes of this issue to the amount of $20,000,000, face value, were sold during the year.

The funded debt of the Southern Pacific Company and Proprietary Companies outstanding at the beginning of the year was as follows, viz.:

Southern Pacific Company		$140,587,410.00
Proprietary Companies		436,717,962.44
Arizona Eastern R. R. Co. and Corvallis & Eastern R. R. Co. not heretofore dealt with as "Proprietary Companies":		
Arizona Eastern R. R. Co.....	$8,496,000.00	
Corvallis & Eastern R. R. Co.....	2,115,000.00	
	$10,611,000.00	
		$587,916,372.44

Issued during the year:

Southern Pacific Company:		
One-Year Five Per Cent. Secured Gold Notes	$20,000,000.00	
Equipment Trust Certificates, Series "A"	5,000,000.00	
		25,000,000.00

Retired during the year:

Southern Pacific Company.		
San Francisco Terminal First Mortgage Four Per Cent. Bonds:		
Purchased from payments to Sinking Fund	$5,500.00	
Arizona Eastern Railroad Company.		
Gila Valley, Globe & Northern Railway Company Five Per Cent. First Mortgage Bonds:		
Purchased from payments to Sinking Fund	2,000.00	
Central Pacific Railway Company.		
Three and One-Half Per Cent. Mortgage Gold Bonds:		
Purchased from sale of lands.....	$359,500.00	
Purchased from sale of securities.....	336,000.00	
Purchased from payments to Sinking Fund	27,000.00	
	$722,500.00	
First Refunding Mortgage Four Cent. Bonds:		
Purchased from payments to Sinking Fund	25,000.00	
	$747,500.00	
Houston & Texas Central Railroad Company.		
Bonds called for redemption or purchased from proceeds of lands sold, viz.:		
First Mortgage Five Per Cent. Bonds	$66,000.00	
General Mortgage Four Per Cent. Bonds	74,000.00	
	$140,000.00	

South Pacific Coast Railway Company.		
First Mortgage Four Per Cent. Bonds:		
Purchased from payments to Sinking Fund	$177,000.00	
Southern Pacific Railroad Company.		
First Refunding Mortgage Gold Bonds:		
Purchased from payments to Sinking Fund	13,000.00	
Texas & New Orleans Railroad Company.		
Payments to State of Texas for account of School Fund Debt	5,570.29	
		1,090,570.29

Amount of funded debt of the Southern Pacific Company and Proprietary Companies outstanding June 30, 1913		$611,825,802.15
Increase during the year		$23,909,429.71
The outstanding bonds are held as follows:		
In the hands of the public		$548,089,802.15
Owned by Southern Pacific Company	$50,829,000.00	
Owned by Proprietary Companies	3,968,000.00	
In Sinking Funds of Proprietary Companies	8,939,000.00	
		63,736,000.00
		$611,825,802.15

ASSETS AND LIABILITIES.

The combined assets and liabilities of the Southern Pacific Company and Proprietary Companies, on June 30, 1913, and the increases and decreases during the year, excluding the offsetting open accounts between the Companies, summarized, were as follows:

	Total June 30, 1913.	Increase or †Decrease.
Capital Assets.		
Cost of road and franchises	$804,315,705.42	$12,144,286.19
New Mexico and Arizona Railroad Co. and Sonora Railway Co. securities	6,718,000.00	.....
Stocks and bonds owned by Southern Pacific Company	* 399,721,147.16	20,016,829.54
Stocks owned by Proprietary Companies	* 579,873.27	249,476.83
Bay Shore Line Terminals, and other real estate	38,816,965.30	818,428.30
Timber-treating plants, saw mills, and other property	361,700.17	11,820.28
Steamships and other floating equipment	13,805,599.47	48,494.58
Rolling stock	27,231,606.09	7,014,339.09
Advances for construction and acquisition of new lines	20,577,374.33	4,230,857.18
Advances for Oakland-Berkeley electric lines	9,962,921.86	961,901.40
Advances to Southern Pacific Railroad Co. of Mexico	38,255,739.49	—771,059.70
Advances to electric lines in California and Oregon	14,070,945.11	4,297,626.99
Advances to Kern Trading & Oil Co	.....	—8,523,255.92
Advances to Pacific Fruit Express Co	257,815.22	—957,108.15
Lands and other investments	3,139,287.12	279,722.63
Advances to Southern Pacific Land Co	3,560,000.00	.....
Sinking funds	* 11,550,890.64	231,947.32
Trust funds	257,017.02	—86,964.15
	*$1,393,182,587.67	$39,967,342.41
Current and Deferred Assets.		
Cash and demand deposits	$19,319,154.15	$8,105,836.81
Special deposit—Equipment Trust, Series "A"	2,490,517.41	2,490,517.41
Union Pacific R. R. Co. bonds purchase notes	.....	—23,740,362.22
Other cash accounts	19,303,117.57	1,186,187.92
Material and supplies	17,518,657.46	788,380.43
Lands and other investments	617,572.31	201,496.57
	$59,249,018.90	—$10,967,943.08
Contingent Assets.		
San Antonio & Aransas Pass Ry. Co	$2,641,870.51	$796,263.36
Expenditures closing crevasse of Colorado River, protection of levees, etc	4,049,434.95	.....
Land contracts	2,392,575.44	1,159,886.34
Unextinguished discount on funded debt	6,882,192.30	593,907.60
	$15,966,073.20	$2,550,057.30
Total assets	*$1,468,397,679.77	$31,549,456.63
Capital Liabilities.		
Southern Pacific Company, common stock	$272,672,405.64	—$3,325.00
Proprietary Companies, common stock	* 315,800,572.00	.....
Proprietary Companies, preferred stock	* 29,400,000.00	.....
	$617,872,977.64	—$3,325.00
Southern Pacific Company, funded debt	$165,581,910.00	$24,994,500.00
Proprietary Companies, funded debt	* 446,243,892.15	—$1,085,070.29
	$611,825,802.15	$23,909,429.71
Total stocks and bonds	*$1,229,698,779.79	$23,906,104.71
Current and Deferred Liabilities.		
Interest and dividends matured but not called for	$353,048.55	—$329,849.08
Dividends due April 1, on S. P. Co. stock owned by O. S. L. R. R. Co	1,899,750.00	1,899,750.00
Interest and dividends due July 1 and October 1	11,777,044.66	6,670.00
Interest accrued to June 30, but not due	5,926,840.57	323,391.19
Due to Union Pacific R. R. Co	.....	—12,000,000.00
Vouchers and payrolls	13,146,072.19	2,941,760.15
Other cash accounts	2,296,970.84	9,674.77
Deferred liabilities	5,351,233.68	3,078,585.83
	$40,750,960.49	—$4,070,017.14

*The capital liabilities include Proprietary Companies' stocks and bonds of the par value of $345,117,800 and $63,736,000, respectively, a total of $408,853,800, which securities are either owned by the Southern Pacific Company and Proprietary Companies, or are held in sinking funds of Proprietary Companies. The cost of these securities is included in the capital assets shown above. Of the said amount, stocks of the par value of $249,653,161, which stand charged on the books at $232,932,667.41, are pledged against the issue of Southern Pacific Company stock and bonds. †In arriving at the increases and decreases for the year, the figures for last year, were revised so as to include the assets and liabilities of the Arizona Eastern R. R. Co. and of the Corvallis & Eastern R. R. Co., which have not heretofore been dealt with as "Proprietary Companies."

Contingent Liabilities.	Total June 30, 1913.	Increase or †Decrease.
Insurance funds	$5,527,782.21	$69,519.77
Rolling stock and floating equipment depreciation and replacement funds	10,394,692.29	719,817.42
Unadjusted accounts	3,062,430.11	847,625.54
Principal of deferred payments on land contracts	2,987,491.47	1,031,704.76
Fund for refunding outstanding old bonds of Southern Pacific Railroad Co.	3,824,197.83	88,813.00
Due to other Proprietary Companies	2,934,175.73	—2,828,787.40
	$28,730,769.64	—$71,306.91
Total liabilities	*$1,299,180,509.92	$19,764,780.66
Balance to credit of Profit and Loss	$169,217,169.85	$11,784,675.97
Total	$1,468,397,679.77	$31,549,456.63

†See note on previous page.

TRANSPORTATION OPERATIONS.

The results of the year's transportation operations compared with those of last year are as follows:

	†This Year.	Last Year.	Increase or Decrease.	Per Cent.
Average miles of railway operated	10,310.99	9,970.40	340.59	3.42
OPERATING INCOME.				
Freight	$80,141,498.84	$72,648,091.65	$7,493,407.19	10.31
Passenger	42,389,837.48	40,269,238.03	2,120,599.45	5.27
Mail	2,460,309.29	2,472,768.90	—12,459.61	.50
Express	2,757,259.88	2,517,086.23	240,173.65	9.54
Other transportation revenues	1,332,463.69	1,223,329.20	109,134.49	8.92
Revenues from operations other than transportation	1,272,323.48	1,302,541.63	—30,218.15	2.32
Total—rail lines	$130,353,692.66	$120,433,055.64	$9,920,637.02	8.24
Revenues from outside operations	12,421,012.41	11,092,114.95	1,328,897.46	11.98
Total	$142,774,705.07	$131,525,170.59	$11,249,534.48	8.55
OPERATING EXPENSES.				
Maintenance of way and structures	$15,589,026.66	$14,464,204.81	$1,124,821.85	7.78
Maintenance of equipment	19,295,724.63	16,318,140.51	2,977,584.12	18.25
Traffic expenses	3,115,078.74	3,201,366.63	—86,287.89	2.70
Transportation expenses	40,408,953.93	38,270,811.05	2,138,142.88	5.59
General expenses	3,726,325.53	3,397,583.32	328,742.21	9.68
Total—rail lines	$82,135,109.49	$75,652,106.32	$6,483,003.17	8.57
Expenses outside operations	10,734,300.58	10,838,936.91	—104,636.33	.97
Taxes	5,697,285.83	5,621,238.96	76,046.87	1.35
Total	$98,566,695.90	$92,112,282.19	$6,454,413.71	7.01
Net operating income over expenses and taxes	$44,208,009.17	$39,412,888.40	$4,795,120.77	12.17
FREIGHT TRAFFIC. (Commercial Freight Only—Way-bill Tonnage.)				
Tons of freight carried	31,642,587	26,950,150	4,962,437	17.41
Tons of freight carried one mile	7,034,174,870	6,145,555,486	888,619,384	14.46
Ton miles per mile of road (*a*)	681,729	615,843	65,886	10.70
Revenue per mile of road (*a*)	$7,583.29	$7,123.32	$459.97	6.46
Revenue per revenue train mile (*a*) (*b*)	$4.33	$4.42	—$0.09	2.04
Average revenue per ton per mile	1.123 cents.	1.168 cents.	—.045 cents.	3.85
Average distance carried	222.30 miles.	228.03 miles.	—5.73 miles.	2.51
PASSENGER TRAFFIC.				
Revenue passengers carried	42,006,240	40,329,011	1,677,229	4.16
Revenue passengers carried one mile	1,834,380,082	1,787,640,025	46,740,057	2.61
Revenue from passenger trains per mile of road (*a*)	$4,549.07	$4,468.67	$80.40	1.80
Revenue from passenger trains per revenue train mile (*a*) (*c*)	$1.64	$1.65	—$0.01	.61
Average revenue per passenger per mile	2.248 cents	2.208 cents.	.040 cents	1.81
Average distance carried	43.67 miles	44.32 miles.	—.65 miles	1.47

†The figures for this year include those of the Arizona Eastern R. R. Co. and of the Corvallis & Eastern R. R. Co., which have not heretofore been dealt with as "Proprietary Companies."

(*a*) Based on traffic over rail lines only, length of ferries used between rail stations excluded in distance over which traffic was moved. (*b*) Based on revenue freight train and all mixed train miles. (*c*) Based on revenue passenger train and all mixed train miles, including miles run by motor cars.

Compared with the previous year, the per cent. of operating expenses to the gross operating income was as follows:

RAIL LINES.	This Year.	Last Year.
For "Maintenance" (*Maintenance of Way and Structures and Maintenance of Equipment*)	26.76	25.56
For "Operation" (*Traffic Expenses, Transportation Expenses, and General Expenses*)	36.25	37.26
Total rail lines	63.01	62.82
Total rail lines and outside operations	65.05	65.76

Business diverted from the lines east of El Paso during the previous fiscal year on account of floods and other disabilities has been recovered, and their share of competitive business substantially increased, while the Pacific System has also yielded a gratifying increase in gross earnings. Upon the whole system, the average passenger revenue has been 2.248 cents per passenger mile in comparison with 2.208 cents per passenger mile in previous fiscal year. The average freight revenue has been 1.123 cents per ton mile in comparison with 1.168 cents per ton mile in previous fiscal year, this decrease being attributable partially to enforced reductions in freight rates by order of State and Federal Commissions and partially to the increase in low-rate and decrease in higher-class tonnage.

Notwithstanding the loss of approximately $1,000,000, due to the partial destruction of the California citrus fruit and vegetable crops by frost, and about $1,125,000 resulting from destruction of sugar cane crops in Louisiana by the overflow of the Mississippi River, the gross earnings of the System during the last fiscal year exceeded by $7,750,000 those of any previous year in the history of the Company.

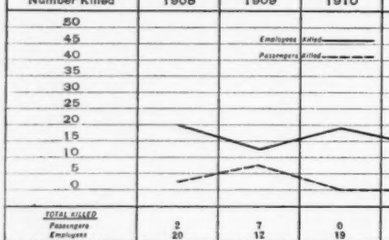
Of the increase of $11,249,534.48 in gross operating income, the sum of $6,454,413.71, or about .57 per cent. was absorbed in increased operating expenses and taxes and $4,795,120.77, or about 43 per cent., was retained as increase in net.

The increase in maintenance expenses is due principally to the large expenditures for rail renewals, there having been renewed this year 639.02 track miles against 256.82 track miles last year; the greater amount of improvements to buildings, grounds, and appurtenances; the greater amount of equipment vacated, and increased repairs to equipment following the shopmen's strike in 1912.

The increase of 5.59 per cent. in transportation expenses is the result principally of an increase of 10.16 per cent. in the mileage of locomotives with freight and mixed trains, made necessary by the increase of 13.68 per cent. in tons carried one mile.

As the reduction in the number of accidents on many railways through the "Safety First" movement has been given wide publicity, attention is directed to the fatalities in train accidents on your lines for six years, which reflect your generous expenditures for safety devices and the unremitting efforts of your officers to discourage assumption of risks and to maintain safe working methods.

FATALITIES IN TRAIN ACCIDENTS



	1908	1909	1910	1911	1912	1913
TOTAL KILLED						
Passengers	2	7	0	0	0	0
Employees	20	12	19	14	42	9
TOTAL KILLED PER MILLION LOCOMOTIVE MILES						
Passengers	0.038	0.143	0	0	0	0
Employees	0.382	0.254	0.360	0.258	0.772	0.156
Passengers Carried	41,393,734	38,337,735	40,190,200	39,989,058	40,329,011	42,006,240
Passengers Carried One Mile	1,640,036,373	1,541,212,518	1,805,834,993	1,808,133,603	1,787,640,025	1,834,380,082
Locomotive Mileage	52,292,012	47,282,374	54,457,917	54,227,433	54,427,530	57,653,935
Number Trainmen in Service	8,481	9,144	9,232	8,605	9,137	9,497

In the four years in which no passenger lost his life in a train accident 220,766,815 locomotive miles were run and 162,514,509 passengers were carried, involving 7,235,988,703 passengers carried one mile. In the year just closed, 9 employees out of 9,497 lost their lives through train accidents in running 57,653,935 locomotive miles. Out of 44,482 employees engaged in pursuits not involving train movements, 16 lost their lives, or one fatality to every 876,400 days, or 2,400 years worked.

Just before this report went to press the trustees of the American Museum of Safety awarded the E. H. Harriman Memorial Gold Medal to the Southern Pacific Company, as "making the best record in accident prevention and industrial hygiene affecting the public and its own personnel," during the year ended June 30, 1913. There were forty-two competitors for the medal, this being the first year it was offered.

GENERAL.

On July 1, 1912, the Arizona Eastern R. R. Co., operating 366.59 miles, and the Corvallis & Eastern R. R. Co., operating 140.58 miles, which had not before been dealt with as Proprietary Companies, were taken into the System, and their assets and liabilities and the results of their operations are included in the exhibits of Proprietary Companies in this report.

As mentioned in last year's report, the property of the Sonora Railway Co., Limited, was sold to the Southern Pacific Railroad Company of Mexico on June 30, 1912, at which time, the lease, under which the Southern Pacific Company has theretofore operated the property was terminated.

Your Company was one of the pioneers in the use of all steel equipment, the first all steel passenger car used on your Company's lines having been placed in service in July, 1906. Since that time your Company has constantly been adding to its steel equipment, and for the past three years has followed the practice of purchasing only all steel cars for passenger service, and either all steel or steel underframe cars for freight service. Of the 2,292 passenger train cars in service at the close of the year, 738, or 32.20 per cent., were all steel; and of the 50,998 freight train cars in service on the same date, 29,279, or 57.41 per cent., were either all steel or steel underframe.

To secure and maintain the highest standard of efficiency and safety of operation, your company has expended large sums in the substitution of steel cars for wooden cars; in the application of air brakes, automatic couplers, and other safety devices; in the elimination or adequate protection of grade crossings; and in the installation of automatic electric block signals. In addition to these expenditures, a large part of which were not required by law, your company has cheerfully made such other expenditures as were required by Federal or State Commissions, or by legislation.

The officers of your Company are too few in number to exert much influence on public opinion, and a large part of their time and energy which should be devoted to that end, and to promoting safer and more efficient management, is consumed in appearing before commissions, to protect the Company's revenues, and before legislative bodies, to argue against ill advised and damaging laws. The present is an age of regulatory legislation, and the stockholders should endeavor to defend their own interests by opposing unwise legislation adversely affecting their Company, and by correcting erroneous impressions current with the public. The ownership of your property is vested at the present time in over 23,000 stockholders, who could and should prove a potent protective force. Apathetic acquiescence on their part in the assaults of the demagogue and of the well intentioned though unenlightened and irrational reformer, tends toward but one result, while concerted effort will do much to repel the attacks and mold public opinion.

The management has labored energetically to conciliate the people of the communities traversed by the Company's lines. As far as possible, the officers of the Company have attended commercial and other public gatherings, with a view to learning their needs and opinions, in order to improve our service and promote harmonious relations between the Company and its patrons. The management is pleased to report the evidence of better feeling towards the Company in these communities than has ever before existed.

The Southern Pacific Railroad Company of Mexico, during the year, continued to suffer from revolutionary disturbances. Not only were structures and equipment destroyed, but business was practically suspended and development of prospective traffic retarded. It is estimated that the loss on account of interruption to traffic, from the beginning of the Madero Revolution, in 1910, to June 30, 1913, amounted to approximately 6,000,000 pesos. During this period the cost of maintaining the property has amounted to about 1,020,000 pesos in excess of the revenue collected. Claims for loss and damage caused by the revolutionary disturbances, amounting to 287,800 pesos, have recently been approved by the Mexican Government, but have not been paid. Claims amounting to 862,200 pesos, covering additional losses, will be presented to the Mexican Government in due course. On account of the fluctuation in the rate of exchange, due to the revolutionary disturbances in Mexico, it is not practicable to state these amounts in U. S. Gold.

The 2.18 miles of road, mentioned in last year's report as being under construction, were completed during the year, the Guadalajara Division being thus extended to La Quemada, 44.12 miles from Orendain, a junction with the National Railways of Mexico, 22.01 miles from Guadalajara. The revolutionary disturbances preclude any thought of completing, at this time, the main line from Tepic to La Quemada, a distance of 99.47 miles.

In addition to the completed lines of railway reported under "Properties and Mileage," and the railway of the Southern Pacific Railroad Company of Mexico referred to above, construction either was completed or is progressing on the lines of the following companies:

	Length of Projected Line. Miles.	Track Completed. Miles.	Grading Completed. Miles.	Grading in Progress. Miles.
Arizona Eastern Railroad:				
Miami to Live Oak, Ariz.	2.13	1.40	.73	
Central Pacific Railway:				
Colfax to Blue Canon, Cal. { East bound track.	10.63	5.06	1.09	4.48
Colfax to Blue Canon, Cal. { West bound track.	14.79	5.68	1.52	7.59
Fernley, Nev., to Walker Mill Junction, Cal.	125.51	105.30	2.59	17.62
Winsted, Cal., to Lawton, Nev.	28.40	9.34	12.43	6.63
Colusa & Hamilton Railroad:				
Hamilton to Harrington, Cal.	61.15	30.63	22.76	7.76
Houston & Texas Central Railroad:				
Giddings to Stone City, Tex.	39.22	32.72	6.50	
**Northwestern Pacific Railroad:*				
Willits toward Eureka, Cal.	105.67	64.47	1.20	40.00
Willamette Pacific Railroad:				
Eugene to Marshfield, Ore.	121.50	13.50	18.65	89.35

*Owned one-half by Southern Pacific Company and one-half by Atchison, Topeka & Santa Fe Railway Co. Advances for construction made by Southern Pacific Company.

On April 1, 1913, Mr. William Mahl, Vice-President and Controller, was retired under the provisions of the Pension Rules, after thirty-one years of faithful and efficient service with the Southern Pacific properties.

The Board announces with sorrow the death, on October 7, 1913, of Mr. Maxwell Evarts, who for more than twenty years served this Company as Attorney, General Attorney, and General Counsel. Your Directors have entered in the minutes of their meetings a resolution reciting his long, faithful, and efficient service.

Under the pension system put into effect on January 1, 1903, there are carried on the pension rolls of the rail and water lines, 610 employees. The payments to them for the year amounted to $263,763.03.